NUS CORPORATION
A Halliburton Company

FINAL DRAFT
PRELIMINARY ASSESSMENT
BORDEN CHEMICAL PRINTING
CAMDEN, NEW JERSEY

FIELD INVESTIGATION TEAM ACTIVITIES AT UNCONTROLLED HAZARDOUS SUBSTANCES FACILITIES — ZONE I

NUS CORPORATION
SUPERFUND DIVISION

02-8901-17-PA
REV. NO. 0

FINAL DRAFT
PRELIMINARY ASSESSMENT
BORDEN CHEMICAL PRINTING
CAMDEN, NEW JERSEY

PREPARED UNDER

TECHNICAL DIRECTIVE DOCUMENT NO. 02-8901-17
CONTRACT NO. 68-01-7346

FOR THE

ENVIRONMENTAL SERVICES DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

JANUARY 30, 1989

NUS CORPORATION
SUPERFUND DIVISION

SUBMITTED BY:

CHARLES LOBUE
PROJECT MANAGER

KURT FENDLER
SITE MANAGER

REVIEWED/APPROVED BY:

RONALD M. NAMAN
FIT OFFICE MANAGER

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT

PART I: SITE INFORMATION

1. Site Name/Alias Borden Chemical Printing
   Street 1625 Federal Street
   City Camden State NJ Zip 08104
2. County Camden County Code 07 Cong. Dist. 1
3. EPA ID No. NJD071462279
4. Latitude 39° 56' 43" Longitude 075° 06' 26"
   USGS Quad. Camden, N.J.
5. Owner Borden Inc. Tel. No. 614-225-4292
   Street 180 E. Broad Street
   City Columbus State Ohio Zip 43215
6. Operator Tel. No.
   Street
   City State Zip
7. Type of Ownership
   ☒ Private ☐ Federal ☐ State
   ☐ County ☐ Municipal ☐ Unknown ☐ Other
8. Owner/Operator Notification on File
   ☒ RCRA 3001 Date 10-9-80 ☐ CERCLA 103c Date
   ☐ None ☐ Unknown
9. Permit Information

Permit	Permit No.	Date Issued	Expiration Date	Comments
RCRA	Unknown	Unknown	Unknown	

10. Site Status
    ☐ Active ☒ Inactive ☐ Unknown
11. Years of Operation 1974 to 1981
12. Identify the types of waste units (e.g., landfill, surface impoundment, piles, stained soil, above- or below-ground tanks or containers, land treatment, etc.) on site. Initiate as many waste unit numbers as needed to identify all waste sources on site.

Waste Unit No.	Waste Unit Type
1	Drums - solid waste/rinse wastes/oil and water-based inks
2	Indoor storage and processing tanks
etc.	

13. Information available from
    Contact Amy Brochu Agency U S. EPA Tel. No. (201) 906-6802
    Preparer Kurt Fendler Agency NUS Corp Date 1-23-89

PART II: WASTE SOURCE INFORMATION

For each of the waste units identified in Part I, compiete the following seven items.

Waste Unit No. 1 - Drums

1. Identify the RCRA permit status, if applicable, and the age of the waste unit.

   Drums of waste oil and water-based inks, solid wastes, and rinsing solvents were stored on site between January 1, 1974 and May 31, 1981. A notification of hazardous waste activity was submitted on August 14, 1980. An application for RCRA Treatment, Storage, and Disposal (TSD) permit was filed on November 18, 1980; Borden Chemical completed closure of the TSD facility on May 31, 1982.

2. Describe the location of the waste unit and identify clearly on the site map.

   The Ipcation of the drum storage area is unknown.

3. Identify the size or quantity of the waste unit (e.g., area or volume of a landfill or surface impoundment, number and capacity of drums or tanks). Specify the quantity of hazardous substances in the waste unit.

   The storage area was 3,750 square feet with a 500-drum capacity. A RCRA Generator Inspection performed on 3-25-81 noted 300 drums of waste oil and water-based ink on site. At the completion of closure activities approximately 750 drums of waste were estimated to have been stored on site during its period of operation.

4. Identify the physical state(s) of the waste type(s) as disposed of in the waste unit. The physical state(s) should be categorized as follows: solid, powder or fines, sludge, slurry, liquid, or gas.

   The drums contained liquids and solids.

5. Identify specific hazardous substance(s) known or suspected to be present in the waste unit.

   Lead, copper, hexavalent chromium, cyanide, barium, and organic solvents.

6. Describe the containment of the waste unit as it relates to contaminant migration via groundwater, surface water, and air.

   Drums containing waste oil and water-based inks appeared to be leaking. Spillage was evident throughout the drum storage area. It is unknown whether there was any type of waste containment system. It is possible that drums were stored directly on the ground.

7. Identify any miscellaneous spills, dumping, etc. on site; describe the materials and identify their locations on site.

   Ten to 15 drums of waste oil and water-based inks appeared to be leaking. Spillage was evident throughout the drum storage area.

Ref. Nos. 1, 8, 13

PART II: WASTE SOURCE INFORMATION

For each of the waste units identified in Part I, complete the following seven items.

Waste Unit No. 2 - Indoor storage and processing tanks

1. Identify the RCRA permit status, if applicable, and the age of the waste unit.

   A series of indoor storage and processing tanks was used for plant operations for storage of feedstock chemicals. The tanks were used between January 1, 1974 and May 31, 1981. A notification of hazardous waste activity was submitted on August 14, 1980. An application for RCRA TSD permit was filed on November 18, 1980; Borden Chemical completed closure of the TSD facility on May 31, 1982.

2. Describe the location of the waste unit and identify clearly on the site map.

   The storage and processing tanks were located on the second floor of the operating portion of the plant.

3. Identify the size or quantity of the waste unit (e.g., area or volume of a landfill or surface impoundment, number and capacity of drums or tanks). Specify the quantity of hazardous substances in the waste unit.

   There were four 1,000-gallon storage tanks and six 1,000-gallon processing tanks used on site. There were also eighteen 1,000-gallon storage tanks which were reportedly empty and unused by Borden Chemical Printing.

4. Identify the physical state(s) of the waste type(s) as disposed of in the waste unit. The physical state(s) should be categorized as follows: solid, powder or fines, sludge, slurry, liquid, or gas.

   Liquid.

5. Identify specific hazardous substance(s) known or suspected to be present in the waste unit.

   Lead, copper, hexavalent chromium, cyanide, barium, and organic solvents.

6. Describe the containment of the waste unit as it relates to contaminant migration via groundwater, surface water, and air.

   The condition of the tanks is unknown. The tanks were located on the second floor of the plant.

7. Identify any miscellaneous spills, dumping, etc. on site; describe the materials and identify their locations on site.

   None reported.

Ref. Nos. 1, 8, 13

PART III: HAZARD ASSESSMENT

GROUNDWATER ROUTE

1. Describe the likelihood of a release of contaminant(s) to the groundwater as follows: observed, alleged, potential, or none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminant(s) to the facility.

   The potential for groundwater contamination exists. Leaking drums and spills were observed in the drum storage area. The depth to the water table is approximately 30 feet. The highly permeable Pleistocene sand would allow the contaminants (metals and organic solvents) to migrate to the groundwater.

   Ref. Nos. 1, 3, 6, 8

2. Describe the aquifer of concern; include information such as depth, thickness, geologic composition, permeability, overlying strata, confining layers, interconnections, discontinuities, depth to water table, groundwater flow direction.

   The groundwater in the area is drawn from the Raritan - Magothy aquifer system. The aquifer system is made up of aquifers consisting of sand with some gravel, and confining units consisting of silts and clays; the system is overiain by highly permeable Pleistocene sand and gravel. The upper unit consists mainly of the sands of the Magothy Formation, and the lower consists mainly of the sands of the Raritan Formation. The upper aquifer is overlain by and hydraulically connected to the Pleistocene deposits in Camden County and is under water - table conditions.

   The Magothy Formation is approximately 100 feet thick, and the Raritan Formation is approximately 80 feet thick in this area. Decrease of pumping in Philadelphia and simultaneous increase of pumping in Camden tend to draw water from Philadelphia toward New Jersey. This causes the groundwater to flow away from the Delaware River in Camden.

   Ref. No. 6, pp. 2, 16, 22

3. Is a designated sole source aquifer within 3 miles of the site?

   The aquifers underiying Camden County are designated as sole source aquifers.

   Ref. No. 5

4. What is the depth from the lowest point of waste disposal/storage to the highest seasonal level of the saturated zone of the aquifer of concern?

   The depth from the lowest point of waste storage (drum storage area) to the highest seasonal level of the unsaturated zone is approximately 30 feet.

   Ref. Nos. 3, 6

5. What is the permeability value of the least permeable intervening strata between the ground surface and the aquifer of concern?

   Sands and gravel are moderately to highly permeable (approximately 10^{-3} cm/sec).

   Ref. Nos. 2, 6

6. What is the net precipitation for the area?

   10 inches.

   Ref. No. 2

7. Identify uses of groundwater within 3 miles of the site (i.e., private drinking source, municipal source, commercial, industrial, irrigation, unusable).

   The groundwater is used for a municipal water supply.

   Ref. Nos. 6, 14

8. What is the distance to and depth of the nearest well that is currently used for drinking or irrigation purposes?

   Distance 2000 ft Depth 169 ft

   Ref. Nos. 4, 6, 14

9. Identify the population served by the aquifer of concern within a 3-mile radius of the site.

   The aquifer of concern is a sole source aquifer, serving approximately 234,200 people within 3 miles of the site, and others beyond that range, via interconnected water supply systems.

   Ref. Nos. 5, 10

SURFACE WATER ROUTE

10. Describe the likelihood of a release of contaminant(s) to surface water as follows: observed, alleged, potential, or none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminants to the facility.

    There is a slight potential for a release of contaminants to surface water. Leaking and deteriorated drums were observed on site in 1981. The drums may have contained the following contaminants: lead, copper, hexavalent chromium, cyanide, barium, and organic solvents. A release of contaminants to the surface water is unlikely due to the following reasons. The runoff would have to flow along the railroad tracks that border the rear of the building or along Federal Street which borders the front of the building. Federal Street contains storm drains, and the bedding of gravel lining the railroad tracks would not allow migration to the Cooper River.

    Ref. Nos. 1, 4, 7, 8, 13

11. What is the facility slope in percent? (Facility slope is measured from the highest point of deposited hazardous waste to the most downhill point of the waste area or to where contamination is detected.)

    Less than 1 percent.

    Ref. No. 4

12. What is the slope of the intervening terrain in percent? (Intervening terrain slope is measured from the most downhill point of the waste area to the probable point of entry to surface water).

    Less than 1 percent.

    Ref. No. 4

13. What is the 1-year 24-hour rainfall?

    2.8 inches

    Ref. No. 2

14. What is the distance to the nearest downslope surface water? Measure the distance along a course that runoff can be expected to follow.

    1,000 feet to the Cooper River.

    Ref. No. 4

15. Identify uses of surface waters within 3 miles downstream of the site (i.e., drinking, irrigation, recreation, commercial, industrial, not used).

    The uses of the surface water are unknown. Due to the commercial and industrial nature of the area, it is presumed that surface water is used for industrial purposes.

    Ref. Nos. 4, 12

16. Describe any wetlands, greater than 5 acres in area, within 2 miles downstream of the site. Include whether it is a freshwater or coastal wetland.

    None

    Ref. Nos. 4, 12

17. Describe any critical habitats of federally-listed endangered species within 2 miles of the site along the migration path.

    None.

    Ref. No. 9

18. What is the distance to the nearest sensitive environment along or contiguous to the migration path (if any exist within 2 miles)?

    None known.

    Ref. Nos . 4, 9, 12

19. Identify the population served or acres of food crops irrigated by surface water intakes within 3 miles downstream of the site and the distance to the intake(s).

    None known.

    Ref. Nos. 6, 1

20. What is the state water quality classification of the water body of concern?

    Cooper River is classified as an FW2-NT water.

    Ref. No. 11

21. Describe any apparent biota contamination that is attributable to the site.

    None reported.

    Ref. Nos. 1, 8

AIR ROUTE

22. Describe the likelihood of a release of contaminant(s) to the air as follows: observed, alleged, potential, none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminant(s) to the facility.

No potential exists. The contaminants are primarily heavy metals, and the facility is inactive; no wastes are currently stored on site.

Ref. Nos. 1, 8

23. What is the population within a 4-mile radius of the site?

Approximately 520,700 people live within 4 miles of the site.

Ref. No. 10

FIRE AND EXPLOSION

24. Describe the potential for a fire or explosion to occur with respect to the hazardous substance(s) known or suspected to be present on site. Identify the hazardous substance(s) and the method of storage or containment associated with each.

All drums, tanks, and wastes have been removed. There is no potential for a fire hazard.

Ref. Nos. 8, 13

25. What is the population within a 2-mile radius of the hazardous substance(s) at the facility?

Approximately 80,000 people live within 2 miles of the site.

Ref. No. 10

DIRECT CONTACT/ON-SITE EXPOSURE

26. Describe the potential for direct contact with hazardous substance(s) stored in any of the waste units on site or deposited in on-site soils. Identify the hazardous substance(s) and the accessibility of the waste unit.

Accessibility to the waste storage area is unknown.

Ref. No. 7

27. How many residents live on a property whose boundaries encompass any part of an area contaminated by the site?

Unknown

28. What is the population within a 1-mile radius of the site?

Approximately 29,900 people live within 1 mile of the site.

Ref. No. 10

PART IV: SITE SUMMARY AND RECOMMENDATIONS

Borden Chemical Printing is an inactive 8.5-acre site located in Camden, Camden County, New Jersey. There are some residential dwellings in the vicinity of the site, but the area is primarily industrial and commercial. From 1974 to 1981 Borden Chemical Printing processed oil- and water-based inks. The property was sold after closure activities were completed; the present owner is unknown.

The oil-based inks were manufactured from oleo-resinate vehicles into which colorants were dispensed by the use of mixing equipment and three-roll mill dispersers. The water-based inks had a different resin system and a much lower viscosity in the final product. The type of equipment used was high-speed mixing equipment plus semicontinuous media mill for dispersion. The resin system, water, and colorant were mixed and then dispersed. After being processed through this equipment, the materials were packed into shipping containers and distributed to customers. The plant contained twenty-four 1,000-gallon storage tanks and six 1,000-gallon processing tanks. Borden Chemical reported using only four of the storage tanks and all of the six processing tanks. There was a waste storage area of 3,750 square feet with a capacity for 500 drums. The exact location of the storage area is unknown. The drums stored in the area contained waste oil and water-based inks, plant processing wastes, and rinse and residue from cleaning of equipment and tanks during closure activities. A RCRA Generator inspection performed on 3/25/81 reported 300 drums of waste on site, 10-15 leaking drums, and spillage throughout the storage area. Contaminants associated with the wastes included lead, copper, hexavalent chromium, cyanide, barium, and organic solvents.

In 1981 production was terminated and cleanup procedures began. All equipment and tanks used by Borden Chemical Printing were cleaned with organic solvents and transferred to other plant locations or sold as scrap. Raw materials and finished products were also transferred to other plant locations. At completion of closure of the facility, a total of 750 drums of waste was attributed to the Borden Chemical RCRA-permitted operation.

The site was given a recommendation for a **MEDIUM PRIORITY** Site Inspection because of the high number of people dependent upon the Raritan-Magothy Aquifer system for drinking water. The Raritan-Magothy Aquifer system is a sole source aquifer, and it is estimated that at least 234,300 people within 3 miles of the site use the aquifer of concern as a drinking source. The depth to the water table in the locality of the site is approximately 30 feet, and the overiying Pleistocene deposits are highly permeable. Upstream and downstream samples of the Cooper River are recommended to document any possible surface water release from the site. On-site soil samples are recommended to characterize current site conditions.

ATTACHMENTS

1. Maps and Photos

   - Site Location Map
   - Site Map
   - Photograph Log

2. References

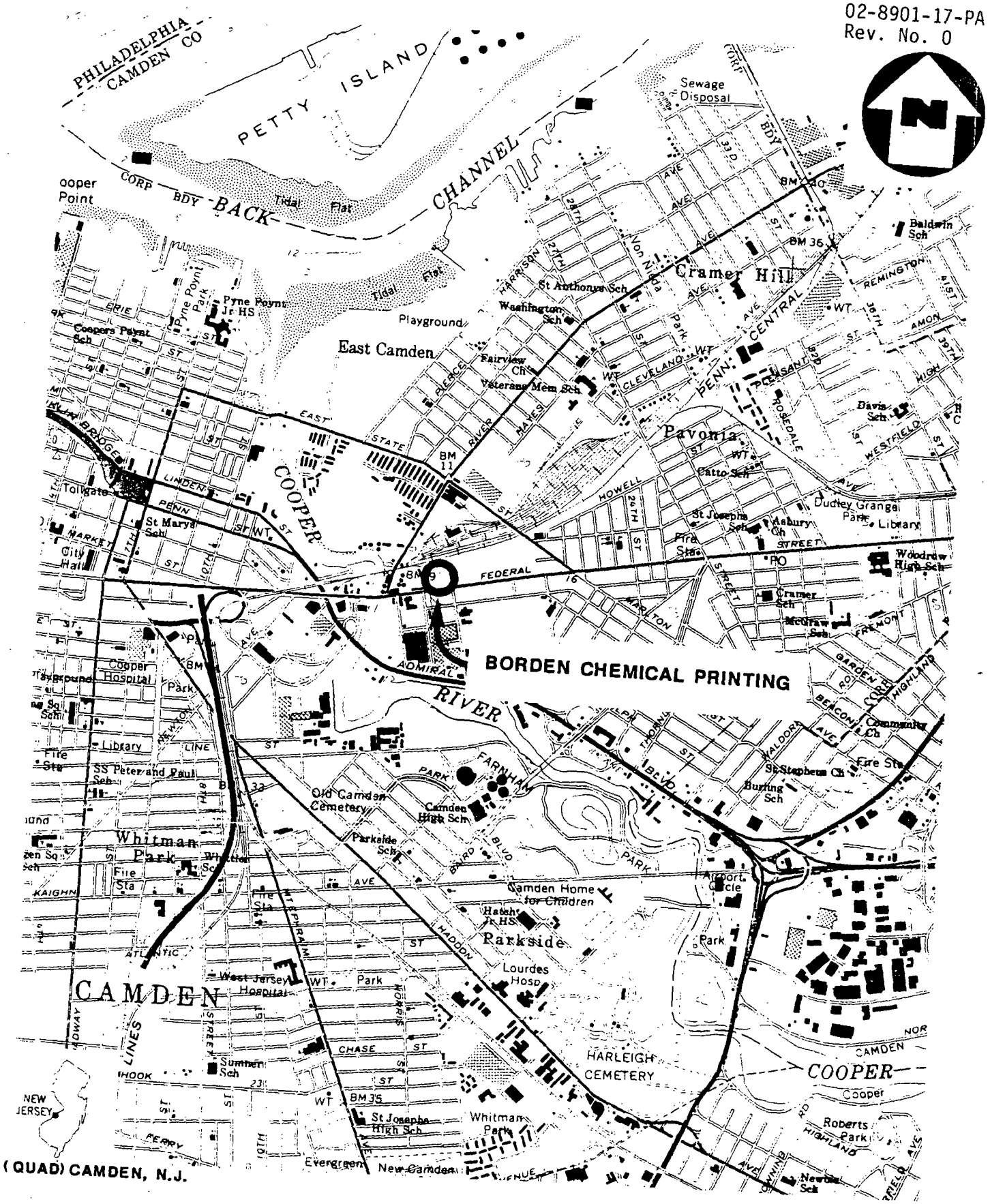
   - All referenced documentation

Sleeve containing preliminary and projected HRS score sheets

ATTACHMENT 1

BORDEN CHEMICAL PRINTING
CAMDEN, NEW JERSEY

CONTENTS

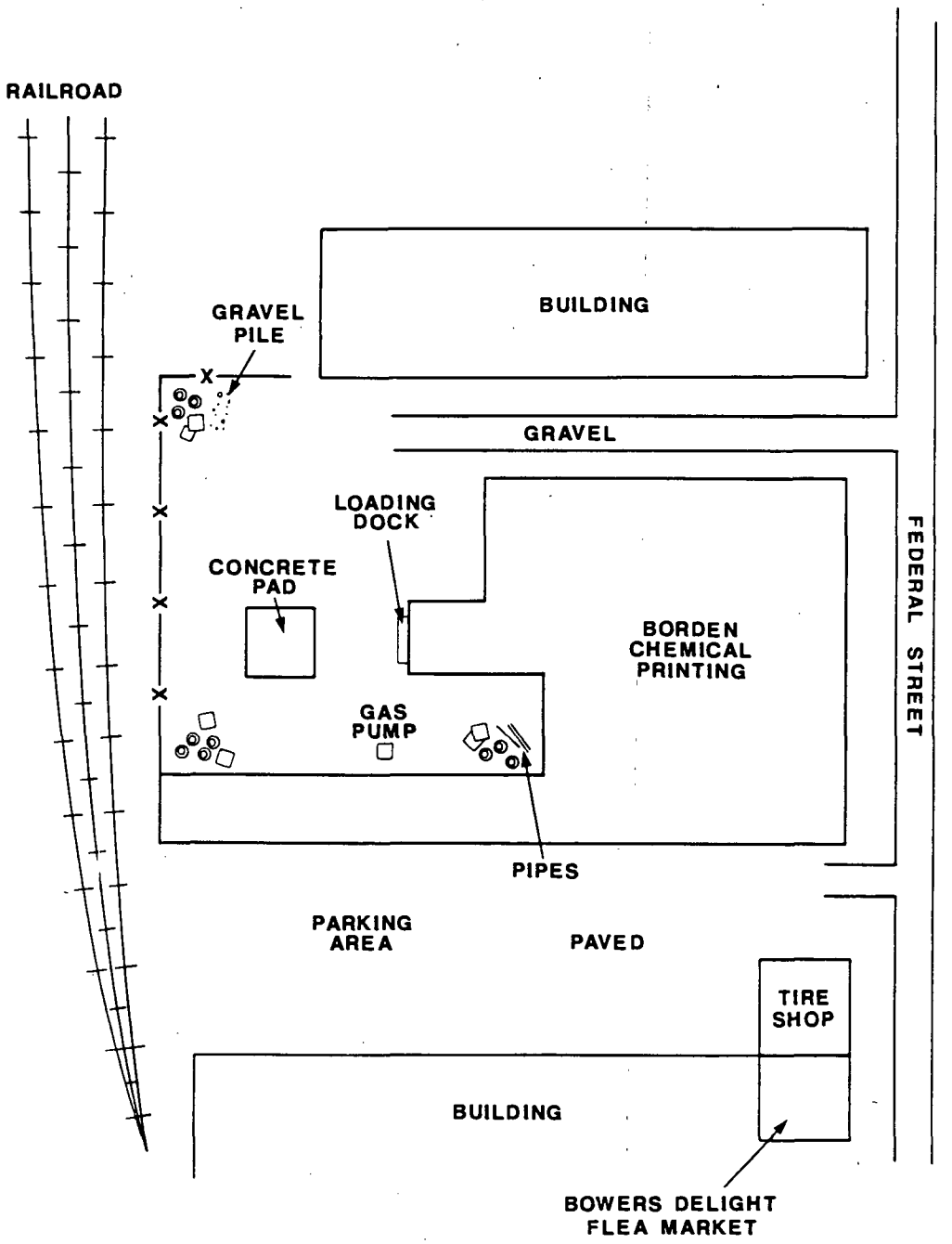


SITE LOCATION MAP
BORDEN CHEMICAL PRINTING, CAMDEN, N.J.

SCALE: 1" = 2000'

FIGURE 1

NUS CORPORATION



SITE MAP

BORDEN CHEMICAL PRINTING, CAMDEN, N.J.

NOT TO SCALE

FIGURE 2

NUS CORPORATION

EXHIBIT A

PHOTOGRAPH LOG

BORDEN CHEMICAL PRINTING
CAMDEN, NEW JERSEY

OFF-SITE RECONNAISSANCE: JANUARY 11, 1989

BORDEN CHEMICAL PRINTING
CAMDEN, NEW JERSEY

PHOTOGRAPH INDEX

ALL PHOTOGRAPHS TAKEN BY DIANE TRUBE ON JANUARY 11, 1989

Photo number	Description	Time
1P-7	Back area of property looking south.	0946
1P-8	Back area of property looking east.	0947

1P-7 January 11, 1989 0946
Back area of property looking south.

1P-8 Janaury 11, 1989 0947
Back area of property looking east.

ATTACHMENT 2

REFERENCE NO. 1

RCRA GENERATOR INSPECTION FORM

COMPANY NAME: BORDEN INC

EPA I.D. NUMBER: NJD071762279

COMPANY ADDRESS: [illegible] ST
CAMDEN, N.J.

COMPANY CONTACT OR OFFICIAL:
[illegible] WOODS

INSPECTOR'S NAME: WAYNE KOWITZ

TITLE: [illegible]

BRANCH/ORGANIZATION: N.J. D.E.P.

CHECK IF FACILITY IS ALSO A TSD FACILITY /X/

DATE OF INSPECTION: 3/25/81

	YES	NO	DON'T KNOW
(1) Is there reason to believe that the facility has hazardous waste on site?	X		

a. If yes, what leads you to believe it is hazardous waste? Check appropriate box:

/ / Company admits that its waste is hazardous during the inspection.

/X/ Company admitted the waste is hazardous in its RCRA notification and/or Part A Permit Application.

/ / The waste material is listed in the regulations as a hazardous waste from a nonspecific source (§261.31)

/ / The waste material is listed in the regulations as a hazardous waste from a specific source (§261.32)

/ / The material or product is listed in the regulations as a discarded commercial chemical product (§261.33)

/ / EPA testing has shown characteristics of ignitability, corrosivity, reactivity or extraction procedure toxicity, or has revealed hazardous constituents (please attach analysis report)

/ / Company is unsure but there is reason to believe that waste materials are hazardous. (Explain)

	YES	NO	DON'T KNOW
b. Is there reason to believe that there are hazardous wastes on-site which the company claims are merely products or raw materials?	—	X	—
Please explain:			
c. Identity the hazardous wastes that are on-site, and estimate approximate quantities of each. 300 DRUMS OF WASTE OIL AND WATER BASED INKS.			
d. Describe the activities that result in the generation of hazardous waste. PRINTING MANUFACTURES OIL BASED AND WATER BASED INKS			
(2) Is hazardous waste stored on site?	X	—	—
a. What is the longest period that it has been accumulated?			
b. Is the date when drums were placed in storage marked on each drum?	—	X	—
(3) Has hazardous waste been shipped from this facility since November 19, 1980?	X	—	—
a. If "yes," approximately how many shipments were made?			
(4) Approximately how many hazardous waste shipments off site have been made since November 19, 1980?			
a. Does it appear from the available information that there is a manifest copy available for each hazardous waste shipment that has been made?	X	—	—
b. If "no" or "don't know," please elaborate.			

	YES	NO	DON'T KNOW
c. Does each manifest (or a representative sample) have the following information?			
- a manifest document number	X		
- the generator's name, mailing address, telephone number, and EPA identification number	X		
- the name, and EPA identification number of each transporter	X		
- the name, address and EPA identification number of the designated facility and an alternate facility, if any:	X		
- a description of the wastes (DOT)	X		
- the total quantity of each hazardous waste by units of weight or volume, and the type and number of containers as loaded into or onto the transport vehicle	X		
- a certification that the materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation under regulations of the Department of Transportation and the EPA	X		
(5) Were there any hazardous wastes stored on site at the time of the inspection?	X		
a. If "yes," do they appear prcperly packaged (if in containers) or, if in tanks, are the tanks secure?		X	
b. If not properly packaged or in secure tanks, please explain. THE DRUMS SHOW SEVERE SIGNS OF WEATHERING. ACCORDING TO DON WOODS, THE WASTE MATERIAL IS PUMPED OUT OF THE DRUMS INTO A TANKER.			
c. Are containers clearly marked and labelled?		X	
d. Do any containers appear to be leaking?	X		
e. If "yes," approximately how many? 10-15. RUSTING IS EVIDENT THROUGHOUT THE DRUM STORAGE AREA.			

*(6) Has the generator submitted an annual report to EPA covering the previous calendar year? ___ ___ ___

a. How do you know?

(7) Has the generator received signed copies (from the TSD facility) of all manifests for wastes shipped off site more than 35 days ago? X ___ ___

a. If "no," have Exception Reports been submitted to EPA covering these shipments? ___ ___ ___

(8) General comments.

* The effective date for this requirement is March 1, 1982.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

RCRA TSD FACILITY INSPECTION CHECKLIST

EPA REGION 2
ENFORCEMENT DIVISION
NEW YORK, N.Y. 10007

Company's Name: [illegible] EPA I.D. #: [illegible]

Company's Address: [illegible] Contact: [illegible]
PLANT MGR

	YES	NO
1. Does the facility have an EPA I.D. number?	(✓)	( )
2. In what capacity does the facility handle hazardous waste? Circle all appropriate	( )	( )

Storer	Treater	Disposer
Pile	Filtration	Landfill
Drums	Incineration	Land Treatment
Surface Tanks	Thermal	Incineration
Subsurface Tanks	Chemical	Surface Impoundment
Surface Impoundments	Biological	Other OFF SITE DISPOSAL
Other _____	Other _____	

3. Does the facility generate hazardous waste?	(✓)	( )
4. Does the facility transport hazardous waste?	( )	(✓)
5. Does the facility comply with the following	( )	( )
a. Adequate Security	( )	( )

Comments: SITE IS FENCED IN

b. Contingency Plan and Emergency Procedures (✓) ( )
Comments: MTS 265.51, .52, .53, .54, .55 AND .56
COMPLIED WITH

c. Inspection Plan ( ) (✓)
Comments: VIOLATION 265.15
NO WRITTEN INSPECTION PLAN

d. Personnel Training ( ) (✓)
Comments: VIOLATION 265.16
NO RECORDS OF TRAINING FOR PLANT
PERSONNEL

e. Waste Analysis Plan ( ) ( )
Comments: _____

f. Preparedness and Prevention Plans ( ) ( )
Comments: _____

6. Has the facility filed a part A permit application? (X) ( )

7. Does the facility maintain manifest records? (X) ( )

8. Does the facility have other environmental permits? ( ) (X)

a. NPDES ( ) ( )

b. Air ( ) ( )

c. State ( ) ( )
--identify

d. Other ( ) ( )
--identify

9. Identify hazardous wastes handled and method for handling

_____

10. General Comments

_____

Inspected by: WAYNE HOWARD

Date: 3/25/81

REFERENCE NO. 2

Uncontrolled Hazardous Waste Site Ranking System

A Users Manual

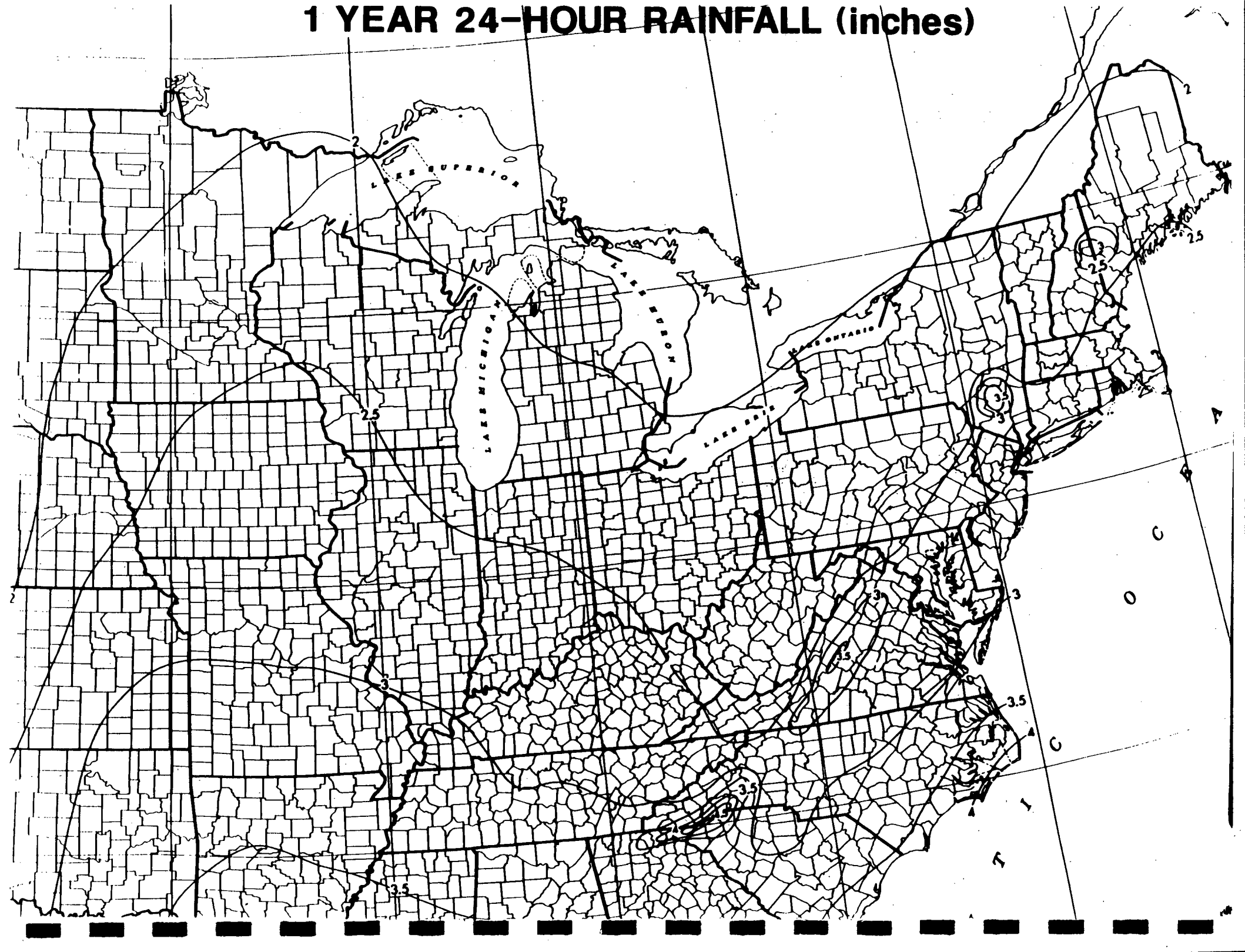
(HW-10)

Originally Published in
the July 16, 1982, *Federal Register*

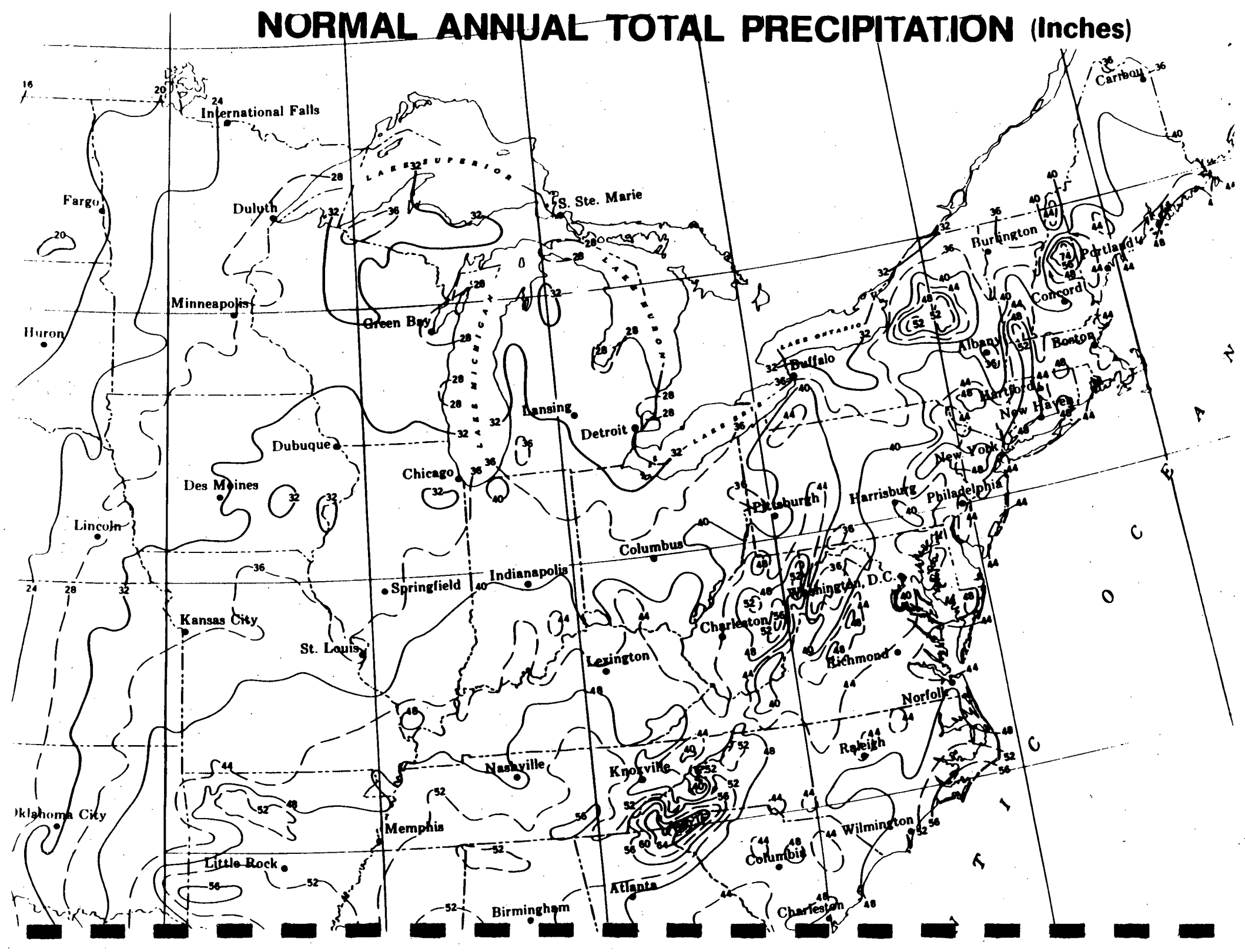
United States
Environmental Protection
Agency

1984

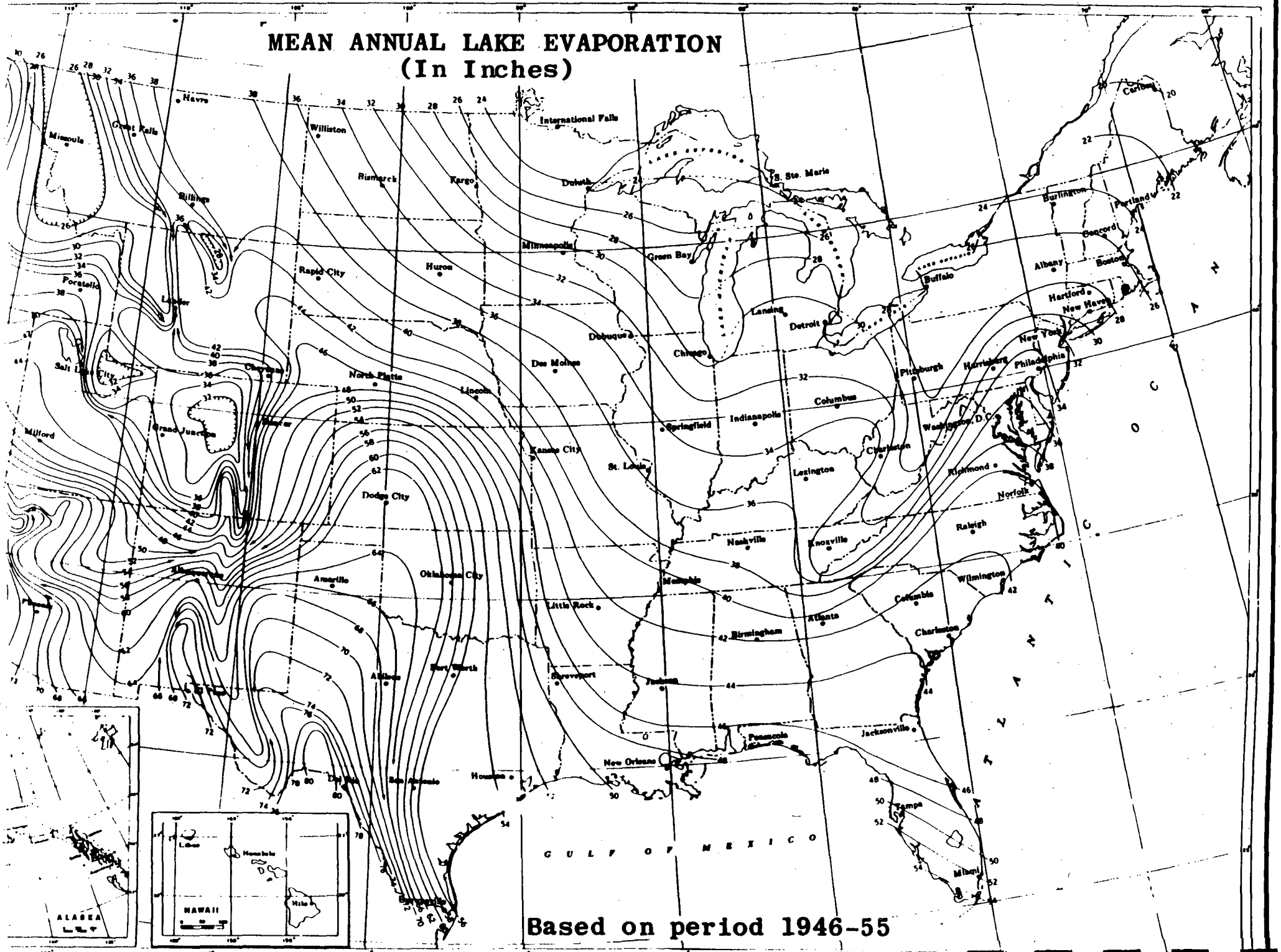
1 YEAR 24-HOUR RAINFALL (inches)



NORMAL ANNUAL TOTAL PRECIPITATION (Inches)



MEAN ANNUAL LAKE EVAPORATION
(In Inches)



Based on period 1946-55

TABLE 2

PERMEABILITY OF GEOLOGIC MATERIALS*

Type of Material	Approximate Range of Hydraulic Conductivity	Assigned Value
Clay, compact till, shale; unfractured metamorphic and Igneous rocks	$<10^{-7}$ cm/sec	0
Silt, loess, silty clays, silty loams, clay loams; less permeable limestone, dolomites, and mudstone; moderately permeable till	$10^{-5} - 10^{-7}$ cm/sec	1
Fine sand and silty sand; sandy loams; loamy sands; moderately permeable limestone, dolomites, and sandstone (no karst); moderately fractured Igneous and metamorphic rocks, some coarse till	$10^{-3} - 10^{-5}$ cm/sec	2
Gravel, sand; highly fractured Igneous and metamorphic rocks; permeable basalt and lavas; karst limestone and dolomite	$>10^{-3}$ cm/sec	3

*Derived from:

Davis, S. N., Porosity and Permeability of Natural Materials In Flow-Through Porous Media, R.J.M. DeWest ed., Academic Press, New York, 1969

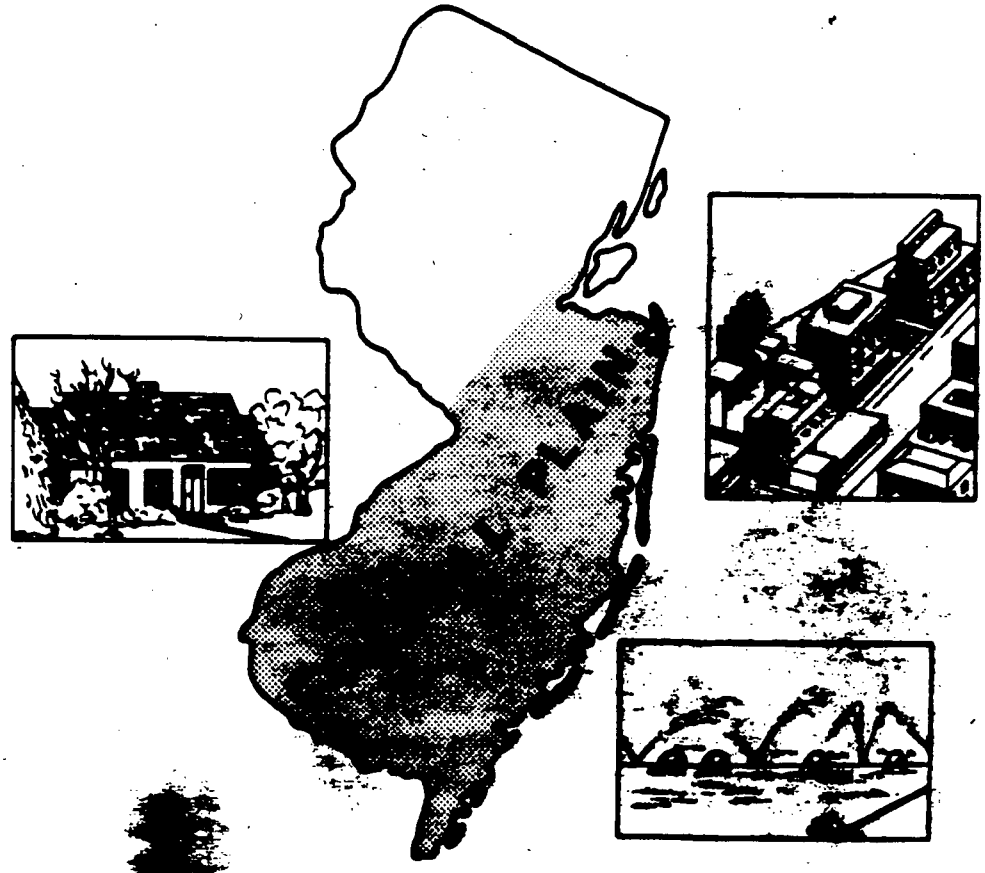
Freeze, R.A. and J.A. Cherry, Groundwater, Prentice-Hall, Inc., New York, 1979

REFERENCE NO. 3

WATER LEVELS IN MAJOR ARTESIAN AQUIFERS OF THE NEW JERSEY COASTAL PLAIN, 1983

U.S. GEOLOGICAL SURVEY

Water-Resources Investigations Report 86-4028



Prepared in cooperation with the
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION, DIVISION OF WATER RESOURCES

WATER LEVELS IN MAJOR ARTESIAN AQUIFERS OF THE NEW JERSEY COASTAL PLAIN, 1983

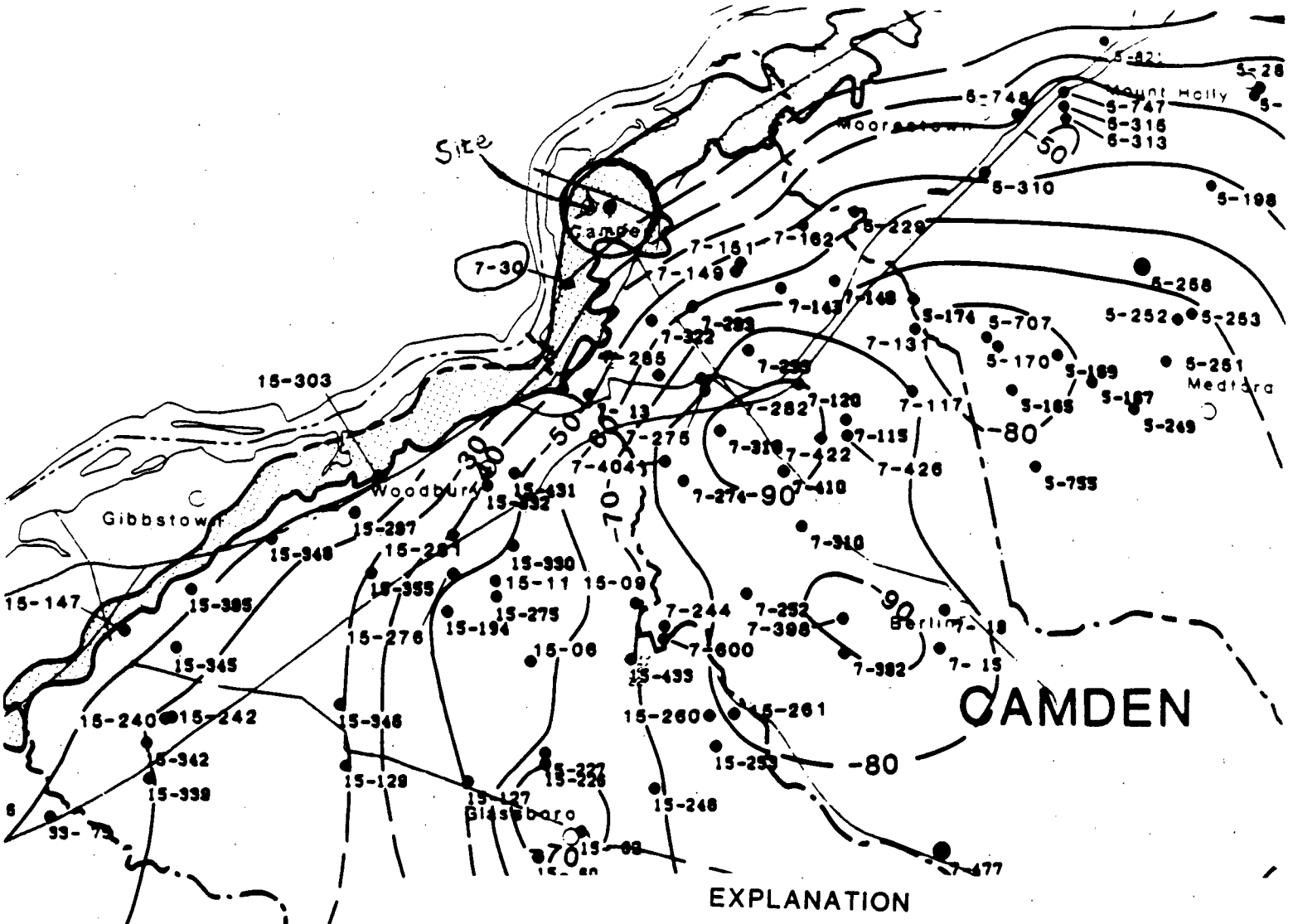
By James A. Eckel and Richard L. Walker

U.S. GEOLOGICAL SURVEY

Water-Resources Investigations Report 86-4028

Prepared in cooperation with the
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION,
DIVISION OF WATER RESOURCES

Trenton, New Jersey
1986



EXPLANATION

OUTCROP AREA OF THE MAGOTHY FORMATION--Contact dashed where approximate. (Modified from U.S. Geofogical Survey, 1967)

OUTCROP AREA OF THE OLD BRIDGE SAND MEMBER OF THE MAGOTHY FORMATION--Contact dashed where approximate. (Modified from Barksdale and others, 1943, p. 21)

-20- POTENTIOMETRIC CONTOUR--Shows altitude at which water would have stood in tightly cased wells. Dashed where approximate. Contour interval 10 feet. National Geodetic Vertical Datum of 1929

5-256 OBSERVATION WELL--Corresponding number shown in table 4 and figure 6. Hydrographs shown in figure 6

15-129 DATA POINT--Corresponding number shown in table 4

WATER-RESOURCES INVESTIGATIONS REPORT 86-4028

PLATE 3

Table 4.--Water-level data for wells screened in the upper aquifer of the Potomac-Raritan-Magothy aquifer system.

Well number	Location: Latitude	Location: Longitude	Owner	Local number	Year drilled	Altitude of land surface[1] (ft)	Screen interval[2] (ft)	Water level 1978: Altitude[1] (ft)	Water level 1978: Date (mo/day)	Water level 1983: Altitude[1] (ft)	Water level 1983: Date (mo/day)	Change in water level (1978-83) (ft)
5- 70	400313	745004	BURLINGTON T WD	TEST 1	1970	60	140- 200	-13	11/14	-11	11/01	2
5- 76	400324	745152	WEAL,CHARLES JR	WEAL	1955	50	59- 80	-3	11/07	-4	10/31	-1
5- 84	400342	744948	MASONIC HOME	MASONIC 1	1921	60[3]	174- 194	-11	11/12	-10	11/01	1
5-116	400708	743836	CHESTRFD SCHOOL	1	1957	102	2[illegible]7- 253	7	10/24	6	10/27	-1
5-160	400315	745408	NJ WATER CO	DVWC 22	1963	45	102- 123	15	11/15	17	10/26	2
5-165	395233	745418	EVESHAM M U A	EMUA 4	1970	110	464- 500	-75	11/14	-81	11/07	-6
5-167	395247	745157	EVESHAM M U A	EMUA 5	1973	50	458- 555[3]	-70	11/14	-79	11/07	-9
5-169	395322	745300	EVESHAM M U A	TEST 12-1972	1972	50	455- 475	-69	11/14	-83	11/07	-14
5-170	395333	745440	EVESHAM M U A	EMUA 1	1956	89	369- 389	-68	11/14	-81	11/07	-13
5-174	395432	745709	EVESHAM M U A	EMUA 3	1967	60	291- 331	-69	11/08	-78	11/07	-9
5-198	395720	744822	MOUNT WOLLT W C	LLWS 2	1960	80	336- 356	-45	11/14	-53	11/01	-8
5-207	400356	744039	VAN MATER, CHAS	CRESANT FARMS		95	325[3]	-13	10/31	-16	10/28	-3
5-211	400438	744519	O'BOILE TRUCKIN	S J GROVE 1	1970	80	220[3]	-5	11/07	-5	10/27	0
5-212	400515	744109	N BURL CO WIGW	1	1959	83	290- 310	-13	11/02	-15	11/10	-2
5-218	405718	744453	RIVER FRT MOTEL	MOTEL		60	100[3]	-2	10/26	-4	10/26	-2
5-229	395630	745855	MAPLE SHADE W D	MSWD 9	1975	40	160- 200	-47	11/09	-57	11/03	-10
5-249	395209	745043	MEDFORD TWP VO	MTWD 3	1968	55	523- 541	-65	11/02	-75	11/03	-10
5-251	395316	744946	MEDFORD W C	MWC 4(1968)	1968	49	506- 536	-57	11/20	-71	11/02	-14
5-252	395413	744922	MEDFORD V C	MWC 1(3)	1957	48	506- 536	-63[3]	11/20	-73	11/02	-10
5-253	395422	744858	MEDFORD LEAS	1-1972	1972	32	447- 471	-58	11/20	-72	11/02	-14
5-258	395524	745025	US GEOL SURVET	MEDFORD 1	1963	71	400- 410	-52	11/06	-65	01/09[3]	-13
5-285	395924	744702	MOUNT WOLLT V C	MWWC 4	1964	16	307- 342	-40	11/14	-37	11/01	3
5-289	395935	744651	MOUNT WOLLT W C	MWWC 3	1953	19	316- 346	-34	11/14	-34	11/01	0
5-310	395728	745504	NJ TURNPIKE AU	MAINT 2	1952	40	120- 160	-40	11/14	-48	10/26	-8
5-313	395830	745302	MAINES, WM JR	FARM WELL 2	1967	25	238[3]	-46	11/16	-51	12/29	-5
5-315	395845	745240	MAINES, WM JR	FARM WELL 1	1958	55	200- 238	-39	11/17	-45	11/04	-6
5-438	400218	744604	THE GOLF FARM		1957	41	2[illegible]0- 230	-22	11/07	-23	10/28	-1
5-446	400328	744636	INTERSTATE S-P	INTERSTATE 1	1960	75	[illegible]0- 245	-14	11/07	-15	10/27	-1
5-707	395343	745501	EVESHAM M U A	EMUA 7	1979	100	405- 441			-86	11/07	
5-728	395819	744341	MOBILE ESTATES	FIELD PUMP	1972	55	485- 500	-31	10/30	-31	10/31	0
5-730	400741	744300	INTERSTATE WAST	MONITOR 9	1978	75	135[3]	5	10/26	4	10/25	-1
5-731	400739	744228	INTERSTATE WAST	MONITOR 8	1978	91	118- 128	2	10/26	2	10/25	0
5-745	400157	744819	BC COUNTRT CLUB	CLUB 1R	1974	102	260- 290	-16[3]	11/14	-17	10/31	-1
5-747	395921	745243	DITTMAR	1949	1949	80	257[3]	-39	11/24	-46	10/31	-7
5-748	395848	745407	USS RANCOCAS	RANCOCAS 1	1959	80	170[3]	-35	11/08	-39	11/08	-4
5-755	395049	745338	KING'S GRANT WC	KCWC 1	1973	90	546- 593			-79	11/04	
5-795	395308	745308	MT LAUREL MUA	MLWC 5	1976	60	416- 463	-79	11/14	-96	11/07	-17
5-820	395049	745334	KING'S GRANT WC	KCWC 2	1973	90	545- 591			-78	11/04	
5-821	400033	745131	FEDERAL LAND BA	1	1983	65	214- 218			-21	11/02	
7- 3	395146	750254	OWENS CORNING	CORNING 1	1956	60	285- 315			-102	11/09	
7- 13	395221	750636	BELLMAWR B W D	BBWD 1	1942	31	111- 160			-46	11/09	
7- 15	394648	745622	BERLIN WATER D	BWD 11	1972	150	675- 745	-78	11/01	-89	11/07	-11
7- 19	394738	745614	BERLIN WATER D	BWD 10	1967	145	645- 713	-75	11/16	-83	02/14[3]	-8
7- 30	395447	750711	SO JRSI PORT CM	NT SWIP 5A	1940	11	27- 104[4]	-22	11/13	-19	11/28	3
7-115	395149	745909	WOODCREST CT CL	CLUB 1	1949	70	400- 420			-84	11/09	
7-117	395229	745712	NJ WATER CO	WVTTON WILL 1	1965	158	552- 562	-76[3]	11/17	-80	12/09	-4
7-120	395237	750031	WUSSMAN REFRIDC	WUSSMAN	1957	67	276- 306	-83	11/12	-90	11/10	-7
7-131	395353	745708	NJ WATER CO	OLD ORCHARD B	1967	71	342[3]	-74	11/08	-79	11/16	-5
7-143	395441	750104	NJ WATER CO	ELLISBURG 16	1957	40	187- 220	-61	11/09	-65	11/16	-4
7-148	395455	745929	NJ WATER CO	KINGSTON 28	1964	44	175- 207	-63	11/08	-66	11/10	-3
T-149	395503	750221	NJ NATIONAL CD	1	1956	15	96- 111	-52	11/15	-54	11/16	-2
7-151	395514	750213	GARDEN STATE RA	RACE TRACK	1944	30	158[1]	-51	11/13	-54	11/09	-3
7-162	395608	750025	NJ WATER CO	COLUMBIA 24	1961	34	112- 167[3]	-46	11/07	-50	11/10	-4
7-193	395256	750633	CRESCENT TRLR PK	1	1952	20	59- 71	-39	11/09	-40	11/14	-1
7-242	394712	750220	SOCIETT DIVERR	SAVNOR	1951	107	492- 512			-76	12/20	
7-244	394715	750419	CAMDEN COURTT	LAKELAND 3		50	93[3]	-70	11/08	-74	11/02	-4
7-252	394759	750158	CAMDEN STATE WC	BLACKWOD DIV 6	1971	75	407- 417	-73	11/09	-84	11/15	-11
7-274	395030	750347	NJ WATER CO	OTTERBROOK 39	1968	60	269- 349	-81	11/08	-87	11/07	-6
7-275	395231	750312	NJ WATER CO	WAODOR 20	1958	60[3]	236- 267	-77	11/09	-78	11/07	-1
7-279	395234	750347	NJ WATER CO	WAODOR 30	1965	65	224- 275	-76	11/09	-72	11/07	4
7-282	395243	750320	NJ WATER CO	WABDOR 11	1945	84	212- 272			-75	11/07	
7-285	395243	750433	NJ WATER CO	EGGBERT 18	1958	24	144- 191	-63	11/09	-64	11/07	-1
7-293	395416	750336	WASDOR TVP BO E	WAODOR TWP NS1	1966	18	142- 162	-56	11/15	-57	11/10	-1
7-299	395322	750158	WAODONFIELD W D	LATRE 2	1956	65	206- 246	-80	11/08	-85	11/04	-5
7-310	394925	750024	NJ WATER CO	LAUREL 13	1954	77	394- 456	-76	11/08	-83	11/16	-7
7-311	394928	750027	NJ WATER CO	LAUREL 15	1964	75	395- 473	-80	11/08	-86	11/16	-6
7-316	395134	750230	NJ WATER CO	MAGNOLIA 33	1967	75	271- 348			-87	11/09	
7-318	395135	750246	OWENS CORNING	CORNING 2	1956	67	290- 320			-92	11/09	
7-322	395359	750445	NJ WATCR CO	OBELEN TRST	1961	33	101- 112[3]	-52	11/07	-53	11/07	-1
7-392	394641	745909	PINE WELL MUA	PWMUA 1	1962	150	627- 669	-71	11/07	-88	11/01	-17

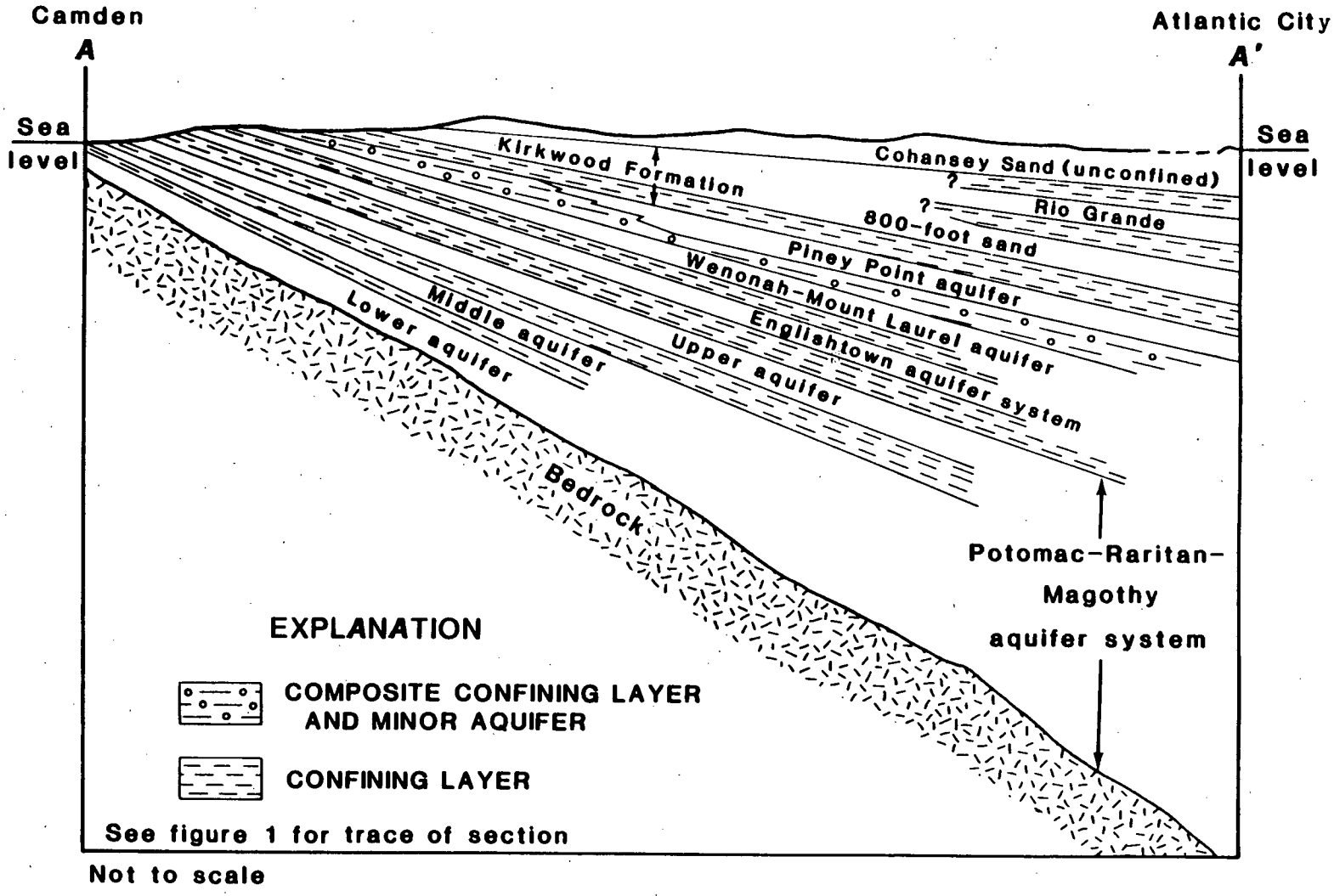
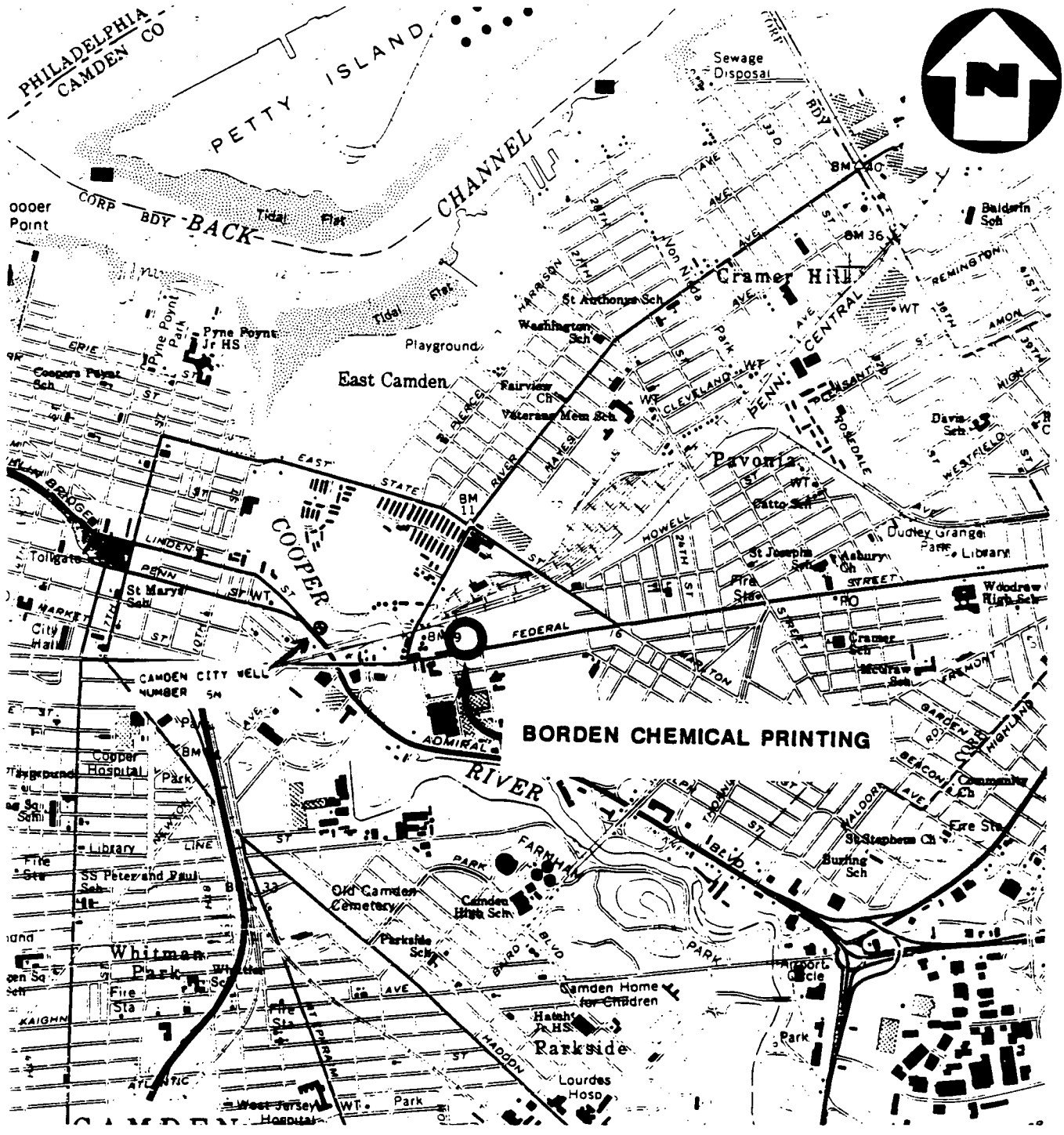


Figure 2.--Diagrammatic hydrogeologic section of the New Jersey Coastal Plain.

REFERENCE NO. 4



SCALE 1 24000

MILE 0 1/2 1

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET

DOTTED LINES REPRESENT 10-FOOT CONTOURS

DATUM IS MEAN SEA LEVEL

DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS MEAN LOW WATER

SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER

THE MEAN RANGE OF TIDE IS APPROXIMATELY 6 FEET

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS

FOR SALE BY U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C. 20242

A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

QUADRANGLE LOCATION

REFERENCE NO. 5

ERP No. D-MMS-A02224-00. Rating EO2, 1989 Central and Western Planning Areas Gulf of Mexico Outer Continental Shelf (OCS) Oil and Gas Sales No. 118 and 122, Lease Offerings offshore the coast of Alabama, Mississippi, Louisiana and Texas.

Summary

EPA expressed objections to the proposed action of unrestricted leasing in the Central and Western Gulf. EPA also expressed concern over the lack of any proposed mitigation for possible impacts to deep-water benthic communities. EPA also expressed concern that ozone modeling of the effect of offshore emission on onshore air quality be conducted.

ERP No. D-NPS-K61093-NV, Rating LO, Death Valley National Monument, General Management Plan, Implementation, Inyo and San Bernardino Counties, CA and Nye and Esmeralda Counties, NV.

Summary

EPA expressed a lack of objections to the proposed management plan but noted that future multiple use activities (mining, campgrounds) will require an assessment of air quality, surface water and ground water impacts.

Final EISs

ERP No. F-COE-H30000-IA, Des Moines Recreational River and Greenbelt Area, Development, Operation and Maintenance, Des Moines River, Webster, Hamilton, Boone, Dallas, Polk, and Warren Counties, IA.

Summary

EPA has no objections to this project with the understanding that each unit of the project will be evaluated separately for NEPA compliance at a later date.

ERP No. F-FHW-F40090-WI, WI-TH-83 Improvement: I-94 to Cardinal Lane/WI-TH-16, Funding and 404 Permit, Waukesha County, WI.

Summary

EPA has no objection to this project, long as a minimum of 0.8 acre of additional wetlands are created.

(Note: The above summary should have appeared in the 0-10-88 Federal Register Notice.)

ERP No. F-USN-C85011-NJ, Colts Neck, Naval Weapons Station Earle Family Housing Development, Construction, Monmouth County, NJ.

Summary

EPA's concern regarding the location of the mitigation site has been addressed in this document; in addition, information within the document clarified our questions with respect to the delineation of wetlands, and the point of discharge of the wastewater treatment plant. Accordingly, EPA has no unresolved concerns regarding the implementation of the project as proposed.

ERP No. F-USN-D81005-VA, Empress II Operation, Electromagnetic Pulse Radiation Environment Simulator for Ships, Chesapeake Bay (West of Bloodsworth Island) and Atlantic Ocean (Virginia Capes Operating Area), off the Coast of VA.

Summary

EPA expressed a preference for the proposed site and requested a thorough monitoring program for the project.

(Note: The above summary should have appeared in the 0-17-88 Federal Register Notice.)

Dated: June 21, 1988.

William D. Dickerson,

Deputy Director, Office of Federal Activities.

[FR Doc. 88-14393 Filed 6-23-88; 8:45 am]

BILLING CODE 6560-50-M

[Cit-FRL-3484-8]

Environmental Impact Statements; Availability; Weekly Receipts

Responsible Agency: Office of Federal Activities, General Information (202) 382-5073 or (202) 382-5075. Availability of Environmental Impact Statements Filed June 13, 1988 Through June 17, 1988, Pursuant to 40 CFR 1506.9.

EIS No. 880180, Draft, BIA, AZ, San Pedro River Riparian Resource Management Plan, Implementation, San Simon Resource Area, Safford District, Cochise County, AZ, Due: September 21, 1988, Contact: Jerrold Coolidge (602) 428-4040.

EIS No. 880190, Draft, DOE, ND, Charlie Creek-Belfield 345 kV Transmission Line Project: Construction, Operation and Maintenance, Implementation, Billings, Stark, McKenzie and Dunn Counties, ND, Due: August 8, 1988, Contact: James D. Davis (406) 657-5525.

EIS No. 880191, Draft, SCS, MD, East Yellow Creek Watershed, Soil Erosion and Flood Damage Reduction Plan, Flooding and Implementation, Sullivan, Linn and Chariton Counties, MO, Due: August 8, 1988, Contact: Russell C. Mills (314) 876-5214.

EIS No. 880192, Draft, NPS, AK, Denali National Park and Preserve, Wilderness Recommendations, Designation or Nondesignation, AK, Due: August 29, 1988, Contact: Linda Nebel (907) 667-2654.

EIS No. 880193, Draft, AFS, WY, Little Bighorn River, Wild and Scenic River Study, National Wild and Scenic Rivers System, Designation, Bighorn National Forest, Sheridan County, WY, Due: September 23, 1988, Contact: Arthur Bauer (307) 672-6761.

EIS No. 880194, Draft, USN, PA, U.S. Navy Girard Point Site, Sale to the Philadelphia Municipal Authority for the Establishment of a Steam Generation Facility that Produces Steam for Purchase by the U.S. Navy, City of Philadelphia, PA, Due: August 12, 1988, Contact: Kenneth Petrone (215) 697-6431.

EIS No. 880195, Final, FHW, PA, PA-23/New Holland Avenue/LR-1123, Section B01 Relocation, US 30 to Walnut and Chestnut Streets, Funding and 404 Permit, Manheim, East Lampeter and Lancaster Townships and the City of Lancaster, Lancaster County, PA, Due: July 25, 1988, Contact: Plilliberi A. Quellet (717) 782-4422.

EIS No. 880196, Draft, FRC, REG, Regulations Governing Independent Power Producers (RM88-4-000) and Regulations Governing Bidding Programs (RM88-8-000), Implementation, Due: August 15, 1988, Contact: Gilda Rodriquez (202) 357-0155.

EIS No. 880107, Draft, SCS, MS, Whites Creek, Watershed Protection and Flood Prevention Plan, Funding, Possible 404 Permit and Implementation, Webster County, MS, Due: August 8, 1988, Contact: L. Peter Heard (601) 965-5205.

EIS No. 880108, Draft, EPA, FL, CF Mining Complex O, Open Pit Phosphate Mine and Beneficiation Plan, Construction and Operation, NPDES and 404 Permits, Hardee County, FL, Due: August 8, 1988, Contact, Maryann Gerber (404) 347-5778.

Dated: June 20, 1988.

William P. Dickerson,

Deputy Director, Office of Federal Activities.

[FR Doc. 88-14392 Filed 6-23-88; 8:45 am]

BILLING CODE 6560-50-M

[FIIL-3340-9]

[redacted]

AGENCY: U.S. Environmental Protection Agency.

ACTION: Notice.

SUMMARY: Notice is hereby given that, pursuant to section 1424(e) of the Safe Drinking Water Act, the Administrator of the U.S. Environmental Protection Agency (EPA) has determined that the

New Jersey Coastal Ptaia Aqatiitr System. underlying the New Jersey Coastal Plan Ares. Is the stile or principal source of drinking weter I8r the Counties of Monmouth. Burlington. Oceen. Camden. Cloucester. Atlantic. Salem. Cumberland. Cape May aod portions of Mercer and Middlesex Counties. New jersey. snd that the acquifer. if contaminated. would create a significant hazard to public heahh. As a result of this action EPA will review. Federally-assisted projects (projects which receive Federal financial assistance through a grant. contract. loan guarantee. or otherwise) proposed for construction in a project review area which includes the New jersey Coastal Plain Area and a portion of the aquifer streamflow source zone. The streamflow source zone includes upstream portions of the Delaware River Basin in the States of Delaware. New jersey. New York and Pennsylvania. Federally-assisted projects will be reviewed to ensure that they are desigted and constructed so that they do not create a significant hazard to public health. Projects outside of the project review area but widhin the streamflow source zone twill be reviewed if they require ao Environmental Impact Statement (EIS).

DATES: This determination shall be promulgated for purposes of judicial review at 1:00 P.M. Eastern Time on July 7. 1988. This determination shall become effective on August 8. 1988.

AOORESSES: The data on which these findings are based. detailed msps of the New jersey Coastal Plain Area and the project review area. a compilation of public comments and the Agency's response to those comments. are available to the public and may ba inspected during normat business hours at the U.S. Environmental Protection Agency. Water Management Diviaion. 20 Federsl Plaza. New Yorit. New Ywk 10278. In addition. copies of a nap showing the designated araa and a responsiveness summaty to publie comment are available upon request.

FOR FUSTMER INFORMATION CONTACT:)ohn Matleck. Chief. Office of Ground Water Management. Watar Management Division. 28 Federal Plaza. New York. New Yorit 10278 (212) 284-5838.

SUPPLEMENTAIRY MFOMIATION: Notice is hereby given that pursuant to section 1424(e) of the Safe Drinking Water Act (42 U.S.C.. 300f. 300h-3(e). Pub. L. 03-523). the Administrator of the U.S. Environmental Protection Agency (EPA) has determined that the New jersey Coastal Plain Aquifer System. underlying tha New jersey Coastsl Plain Area. is the sole or principal source of drinking wster for the Counties of Monmouth. Burtington. Ocean. Camden. Cloucester. Atlantic. Salem. Cumberland. Cape May and portions of Mercer and Middlesex Counties. New jersey. Pursuant to section 1424(e). Federally-assisted projects proposed for construction in the New jersey Coastal Plain Area and the project review area wiihin portions of its streamflow source zone will be subject to EPA review. The streamflow source zone for the New jersey Coastal Plain Aquifer System includes upstream portions of the Delaware River Basin in the States of Delaware (New Castle County). New jersey (Mercer-part. Hunterdon-part. Sussex-part. and Warren Counties). New York (Delaware. Orange. Sullivan and Ulster Counties). and Pennsylvania (Berks-part. Bucks. Carbon-part. Chester-part. Delaware. Lackawanna-part. Lancaster. Lehigh. Luzeme-part. Monroe Montgomery. Northampton. Philadelphia. Pike. Schuykill and Wayne Counties). The project review area includes that portion of the streamflow source sone which lies within two milee of the Delaware River in the States of New jersey (in Mercer. Huntrsdon. Sussex and Warren Counties). Delaware (in New Castle County). Pennsylvania (in Delaware. Philadelphia. Bucks. Monroe. Northampton. Pike and Wayne Counties) and New Ynrk (in Delaware. Orange and Sullivan Counties).

L Background

Section 1424(e) of the Safe Drinking Water Act states: (e) If tha Administrator determines. on his own initiative or upon petition. that an area has an aquifer which is the sole or principal drinking water source for tba area and which. if contaminated. would create a significant hazard to publie health. be shall publish notice of that determination in the Federal Register. Afler the publication of any such notice ao commitment for Federal financial assistance (through a grant. contract. loan guarantee. or otherwise) may ba entered into for any project which tha Administrator determines may contaminate such aquifer through a recharge zone so as to create a significant hazard to public health. but a commitment fbr Federal financial assistance may. if authorized under another provision of law. ba entered into to a ptan or design the project to assure that it will not so contaminate the aquifer.

On December 4. 1978 the Environmental Defense Fund. Inc. and the Sierra Club New jersey Chapter petitioned the EPA Administrator to determine that the Counties of Monmouth. Burlington. Ocean. Camden. Cloucester. Atlantic. Salem. Cumberland. Cape May and portions of Mercer and Middlesex Counties. New jersey. constitute an area whose aquifer system is "the sole or principal drinking wster source for the area and which. if contaminated. would create a significant hazard to public health." On March 21. 1979. EPA published the petition in the Federel Register. Public hesrings on the petition request were held May 1. t8 snd 17. 1979 in Undenwold. Trenton. Freehold and Pomona. New jersey. A May 19. 1983 Federal Register notice announced the availability of additiona) technical information and the extension of public comment period to July 15. 1983.

II. Basis for Determioatioa

Among the factors to be considered by the Administrator in connection with the designation of an area under section 1424(e) are:

(1) Whether the squifer is the area's sole or principal souree of drinidng water and (2) whether contamination of the aquifer would create a significant hazard to public health.

On the basis of information available to this Agency. the Administrator has made the following findings. which are the basis for the determination noted above:

(1) The New jersey Coastal Plain Area depends upon the underlying Coastal Plain Aquifer System for seventy-five (75) per cent or more of its drinlung water to serve 3 million people.

(2) Data show that the formations of the New jersey Coastal Plain Area are hydrologically interconnected such that they respond collectively as an interretated aquifer system.

(3) If the equifer system were to become contaminated. exposure of the persons served by the system would constitute a sigpificant hazard to public health.

(4) Altemative supplies capable of proyiding fifty (50) per cent or more of the drinking water to the designated area are not available at aimilar economic costs.

The New jersay Coastal Plain Aquifer System is highly susceptible to contamination through its racharge zone from a numbar of sources. including but not limited tn. chemical spills. leachate from landfills. storm.water runoff. highway da-icing. faulty septic systems wastewater treatment systems and waste disposal lagoons. The aquifer is also susceptible to contaminstion to a lesser degree from the same sources. through its streamflow source zone. Since ground-water contamination can be difficult or impossible to reverse

completely and since the acquifer in this orea is solely or principally rolled upon for drinking water purposes by lha population of the New Jersey Coastal Plain Area. contamination of the aquifer could pose a significant harard to public health.

III. Descriptioo of the New Jersay Coastal Plaia Area Aquifer System. lis Recharge Zone and lts Streamflow Source Zoaq

The New Jersey Coastal Plain Aquifer System consists of a wedge-sheped mass of unconsolidated sediments composed of clay. silt. sand and gravel. The wedge thins to s feathered edge along thc Foil Line and attains a thickness of over 6.000 feet at the tip of Cape May County. New Jereey.

These sediments range in ege from Cretaceous to Holocene and can be classified as continental. coastal or marine deposits. There are five major aquifere within the Coastal Plain Aquifer System. They ars the Potomac-Raritan-Mugothy Aquifer Systeoi. Englishtown Aquifer. Wenonah-Mouat Laurel Aquifer. Kirkwood Aquifer and the Cobansey Aquifer. Natural recharge to the New Jersey Coastal Plain Aquifer System occurs primarily through direct preelpitction on the outcrop area of lhe geologic formations. A smaller component of natural sechaigc to the deeper layers of the systeoi occurs hy vertical leakage from the upper layers. This accounts for a small percentage of the total amount of recharge: however. orcr a large area and a long period of lime the amount of water truusmittnd can be significant.

Thc New Jersey Coastal Plain Aqidfer discharges to thc surfaoe throsgb streams. springs and evapotranspiration. Many rtreanis ultimately flow into bays or directly into the ocean. Dcvclopment of the ground-water reaarvoir as a watar supply source eonstitntcs another discharge component which today accounts for a significant portion of dischsrge from the overall system. In certain areas (e.g. along the Delaware River) heavy pumping has caused a reveraal in die normal discharge from the aquifer (Raritan-Msgothy) such that the surface stream (Delawan: River) now recharges the aquifer. This phenomenon implies that. ia addition to the New Jersey Coastal Plain Area. the Delaware River Basin within Delaware. New Jeraey. Pennsylvania and New York must be regarded as a streamflow source zone (an upstream headwaters area which drains into a recharge zone). which flows into the Coastal Plain Area.

IV. Information Utilized la Detereiinatioa

The information utilized in this determination tncludes the petition. written and verbal conunents submitted by the public, and various technical publications. The above data ara available to the public and may be inspected during normal business hours at the U.S. Environmental Protection Agency. Region II. Water Management Division. 28 Federal Plaza. New York. New York 10278.

V. Project Review

When lhe EPA Administrator publishes his determination for a aole or principal drinking water source. no commitment for Federsl financial assistance may be may if the Administrator finds that thc Federally-assisted project may contaminate tha aquifer through a recharge zone so as to create a significant hazard to public beolth . . . Safe Drinking Water Act section 1424(e). 42 U.S.C. 300h-3(e). In many cases. these Federally-assisted projects would also be analyxcd in an "Environmental Impact Statement" (EIS) nnder die National Environmental Policy Act (NEPA). 42 U.S.C. 4332(2)(C). All EISs. as well as any other proposed Federal actions affecting an EPA program or responsibility. are required by Federal law (under tlie so-called "NEPA/309" process) [1] to be reviewed and commented upon by tha EPA Administrator. Therefore. in order to streamline EPA's review of the possible environmental impacts on designated aquifers. when an action is analysed in an EIS. the two reviews will be consolidcied. end both authorities will be cited. Thc EPA review (under the Safe Drinking Water Act) of Federally-assisted projects potentially affecting sole or principal source aquifers. will be included in tlie EPA review (under the "NEPA/309" process) of any EIS accnmpanying the sarse Federally-assisted project. The letter transmitting EPA's comments on the final EIS to tbe lead agency will be the vehicle for informing the lead agency of EPA's actions under section 1424(e).

All Federally-assisted proposed projects will be reviewed. within the New Jereey Coastal Plain Area (Counties of Monmouth. Burlington. Ocean. Camden, Gloucester. Atlantic. Sulem. Cumberland and Cape May. and portions of Mercer and Middlesex Counties. New jersey (os delineated on maps included in thr petition). and that portion of the strr amflow source zone which lies within two milcs of the Delsware River in the Stetes of New Jersey (in Mercer. Hunterdon. Sussex and Warren Counttrs). Delawsre (in New Castle County). Pennsylvania (in Delaware. Philadelphia. Bucks. Monroe. Northampton. Pike snd Wsyne Counties) and New York (in Delaware. Orange and Sullivan Counties) (as delineated on maps included in the public record). Outside thc New jereey Coastal Plain Area and further than two miles trom tlie Delaware River in the streamflow source zone. only those Federally-assisted proposed projects requiring the preparation of an EIS will be reviewed. The Agency has chosen a two-mile limit for the project review area along the Delaware River based on the climote and hydrologic setting of the area. The two-mile distoncc is consistent with the two-mile review radius included in the EPA guidelines for Ground-Water Clasrifiration and is protective of human health.

VI. Sumrsary and Discussion of Public Comawots

There hss been much controverey over the possible designation of this aquifer system. The majority of the comments from lhe original 1979 public hearings were in direct opposition to such a designation. More than half of all responses received were against designation. Several conunenters felt constrained by lhe original coomeni period and thereby requested an extension. EPA complied with this request oo two occasions. once by announcing at the four public bearings it held throughout the area under consideration that the agency bad extended the formal comment period from May 14. 1979. to December 31. 1979. and again in a May 10. 1983 Fedaral Register Notice tlat announced the availability of additional information and extension of the public comment period to July 18. 1983. Although a number of ground-wster protection measures are available et the Federal. Slate and local level. none of these. either individually or collectively. pennit EPA to act as directly as would a sole source aquifer designation in tlie rerview and approval of Federally-assisted projects. In addition. EPA feels that the sole source project review process will foster integration rather then duplication of environmental review efforts. Memoranda of Understsnding have been negotieted with various Federal agencies with the porpose of streamlining thr review process and minimizing project delays. Must of the commenters expressed concem that a

[1] 42 U.S.C. § 7609 requires EPA to conduct this review. The "309" in a "NEPA/309" derives from the original source of this general requirement: Section 309 of the Clean Air Act.

designation would be a duplication of efforts already existing on the state and local levels. Some commenters felt that a safe source aquifer designation would give EPA the power to reject any applications for Federally-funded projects indiscriminately and to delay any project underway. Another main concern of many commenters was that a designation would cause a strong negative economic impact on the area in question and curtail needed development, thus eliminating jobs. EPA is sympathetic to the concerns of the commenters; however, the Agency feels that a sole source aquifer designation would not interfere with economic development. Federal financial assistance will be withheld only in those instances where it is determined that a proposed project may contaminate the aquifer so as to create a significant hazard to public health and no acceptable remedial measures are available to prevent the potential hazard.

Dated: June 16, 1988.

Lee M. Thomas,

Administrator.

[FR Doc. 88-14253 Filed 6-23-88; 8:45 am]

BILLING CODE 6560-50-M

[OPTS-59945; FRL-3404-5]

Toxic and Hazardous Substances; Certain Chemicals Premanufacture Notices

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

SUMMARY: Section 5(a)(1) of the Toxic Substances Control Act (TSCA) requires any person who intends to manufacture or import a new chemical substance to submit a premanufacture notice (PMN) to EPA at least 90 days before manufacture or import commences. Statutory requirements for section 5(a)(1) premanufacture notices are discussed in the final rule published in the Federal Register of May 13, 1983 (48 FR 21722), in the Federal Register of November 12, 1984 (49 FR 48666) (40 CFR 723.250). EPA published a rule which granted a limited exemption from certain PMN requirements for certain types of polymers. Notices for such polymers are reviewed by EPA within 21 days of receipt. This notice announced receipt of nine such PMNs and provides a summary of each.

DATES: Close of Review Periods:

Y 88-192, 88-193—June 5, 1988.
Y 88-194—June 9, 1988.
Y 88-195—May 17, 1988.
Y 88-196—June 8, 1988.
Y 88-197—June 14, 1988.
Y 88-198—June 15, 1988.
Y 88-199—June 10, 1988.
Y 88-200—June 23, 1988.

FOR FURTHER INFORMATION CONTACT: Stephanie Roan, Premanufacture Notice Management Branch, Chemical Control Division (TS-794), Office of Toxic Substances, Environmental Protection Agency, Rm. E-611, 401 *M* Street SW., Washington, DC 20460 (202) 382-3725.

SUPPLEMENTARY INFORMATION: The following notice contains information extracted from the non-confidential version of the submission provided by the manufacturer on the PMNs received by EPA. The complete non-confidential document is available in the Public Reading Room NE-G004 at the above address between 8:00 am and 4:00 pm, Monday through Friday, excluding legal holidays.

Y 88-192

Manufacturer. Confidential.
Chemical. (C) Hydroxy fluorfon acrylic resin.
Use/Production. (S) Coatings. Prod. range: Confidential.

Y 88-193

Manufacturer. Confidential.
Chemical. (C) Polyurethane resin.
Use/Production. (S) Coating. Prod. range: Confidential.

Y 88-194

Manufacturer. Sybron Chemicals Inc.
Chemical. (G) Copolymer of aliphatic esters of 2-propenoic acid with homocyclic and heterocyclic aromatic vinyl compounds, reaction product with aliphatic polyamine.
Use/Production. (C) Waste and process water purification. Prod. range: Confidential.

Y 88-195

Manufacturer. Confidential.
Chemical. (C) Dibasic acid polyol polyester.
Use/Production. (G) Used in coatings. Prod. range: Confidential.

Y 88-196

Manufacturer. Confidential.
Chemical. (S) Rosin, dicyclopentadiene, dimer fatty acid polymer.
Use/Production. (S) Printing ink vehicles. Prod. range: 2,000,000-3,000,000 kg/yr.

Y 88-197

Manufacturer. Reichhold Chemicals Inc.
Chemical. (C) Sunflower oil alkyd.
Use/Production. (S) Architectural trade sales coating. Prod. range: Confidential.

Y 88-198

Manufacturer. Confidential.
Chemical. (C) Aliphatic polyester urethane.
Use/Production. (C) Coatings. Prod. range: Confidential.

Y 88-199

Manufacturer. C.J. Osborn.
Chemical. (C) Polyester.
Use/Production. (S) Pigmented and clear finish. Prod. range: Confidential.

Y 88-200

Manufacturer. Confidential.
Chemical. (G) Styrene/acrylic copolymer.
Use/Production. Coatings and inks. Prod. range: Confidential.

Date: June 13, 1988.

Steve Newburg-Rinn

Acting Chief, Public Data Branch, Information Management Division, Office of Toxic Substances.

[FR Doc. 88-14292 Filed 6-23-88; 8:45 am]

BILLING CODE 6560-50-M

FEDERAL COMMUNICATIONS COMMISSION

Public Information Collection Requirement Submitted to Office of Management and Budget for Review

June 16, 1988.

The Federal Communications Commission has submitted the following information collection requirement to OMB for review and clearance under the Paperwork Reduction Act of 1980 (44 U.S.C. 3507).

Copies of this submission may be purchased from the Commission's copy contractor, International Transcription Service, (800) 452-3800, 2100 M Street NW., Suite 140, Washington, DC 20002. For further information on this submission contact Judy Boley, Federal Communications Commission, (202) 632-7513. Persons wishing to comment on this information collection should contact Yvette Flynn, Office of Management and Budget, Room 3235 NEOB, Washington, DC 20503, (202) 395-3785.

OMB *Number:* 3060-0025.
Title: Application for Restricted Radiotelephone Operator Permit—Limited Use.
Form Number: FCC 753.
Action: Revision.
Respondents: Individuals or households.

REFERENCE NO. 6

GEOLOGY AND GROUND-WATER RESOURCES OF CAMDEN COUNTY, NEW JERSEY

By George M. Farlekas, Bronius Nemickas, and Harold E. Gill

U.S. GEOLOGICAL SURVEY
Water-Resources Investigations 76–76

Prepared in cooperation with
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION, DIVISION OF WATER RESOURCES

June 1976

A B S T R A C T

Camden County, New Jersey, is located in the Philadelphia-Camden metropolitan area. The western edge of the county is urban and industrial in character. The central part is less industrial and more suburban in character, and the eastern part is sparsely populated and predominantly agricultural, although urbanization is advancing eastward quite rapidly.

Camden County is in the Atlantic Coastal Plain physiographic province. Underlying the county are unconsolidated sediments of Quaternary, Tertiary, and Cretaceous age, consisting of mostly alternating sands, silts, and clays. The sediments dip gently to the southeast and thicken from 40 feet at the Delaware River to 2,900 feet at the Camden-Atlantic County line. Below the unconsolidated sediments is the pre-Cretaceous crystalline bedrock.

The major fresh-water aquifers in Camden County are sands and gravels of Cretaceous and Tertiary age in the Potomac Group and the Raritan and Magothy Formations; the Cohansey Sand; the Wenonah Formation-Mount Laurel Sand; and the Englishtown Formation. Minor aquifers are found in parts of the Merchantville Formation, the undifferentiated Vincentown and Manasquan Formations, and the Kirkwood Formation. Saturated sands and gravels in the surficial deposits of Quaternary age where in direct contact are commonly hydraulically connected to the underlying aquifers.

The rate of ground-water withdrawal for Camden County was 68 mgd (million gallons per day) in 1966. This was the largest average annual county pumpage in the State in 1966. Eighty-five percent (56 mgd) was pumped from the aquifer system in the Potomac Group and the Raritan and Magothy Formations.

The potentiometric surfaces of all the major artesian aquifers in Camden County declined from 1900 to 1970 as a result of pumping. The largest decline occurred in the aquifer system in the Potomac Group and the Raritan and Magothy Formations. At Haddon Heights, in the western part of the county, the potentiometric surface declined about 110 feet from 1900 to 1968. The potentiometric surface of the aquifer in the Wenonah Formation-Mount Laurel Sand declined 43 feet in about 60 years in the vicinity of Berlin Borough.

The chemical quality of ground water in Camden County

is generally satisfactory for most uses. Concentrations of iron greater than the State's potable-water standard of 0.3 milligrams per liter are found in some areas of the Potomac-Raritan-Magothy aquifer system, in scattered locations in the Wenonah Formation-Mount Laurel Sand, and in the Cohansey Sand. In general, higher values of dissolved solids, sulfate, and chloride occur in water in and near the outcrop of the Pctomac-Raritan-Magothy aquifer system than downdip in the aquifer. In the southeastern part of the county chloride concentrations in excess of 250 milligrams per liter can be found in tba same aquifer system. The high chloride water has remained in the aquifer system from the time of deposition or has re-entered the system from the ocean after changes in sea level since Pleistocene time.

Contamination of water in the Potomac-Raritan-Magothy aquifer system in the Philadelphia area has created a potential water-quality problem for the Camden area near the Delaware River. Contaminated ground water in Philadelphia, with high concentrations of sulfate and dissolved solids, is moving under the Delaware River toward Eagle Point in Gloucester County near the Camden County line. Decrease of pumping in Philadelphia and simultaneous increase of pumping in Camden and Gloucester Counties tends to draw ground water from Philadelphia toward New Jersey.

The greatest potential for additional ground-water development in the county is from the Cohansey Sand which is generally an unconfined aquifer. The Cohansey also has the greatest possibility of ground-water contamination because of the local effect of wastes from suburban and industrial development and the shallow depth of the Cohansey aquifer.

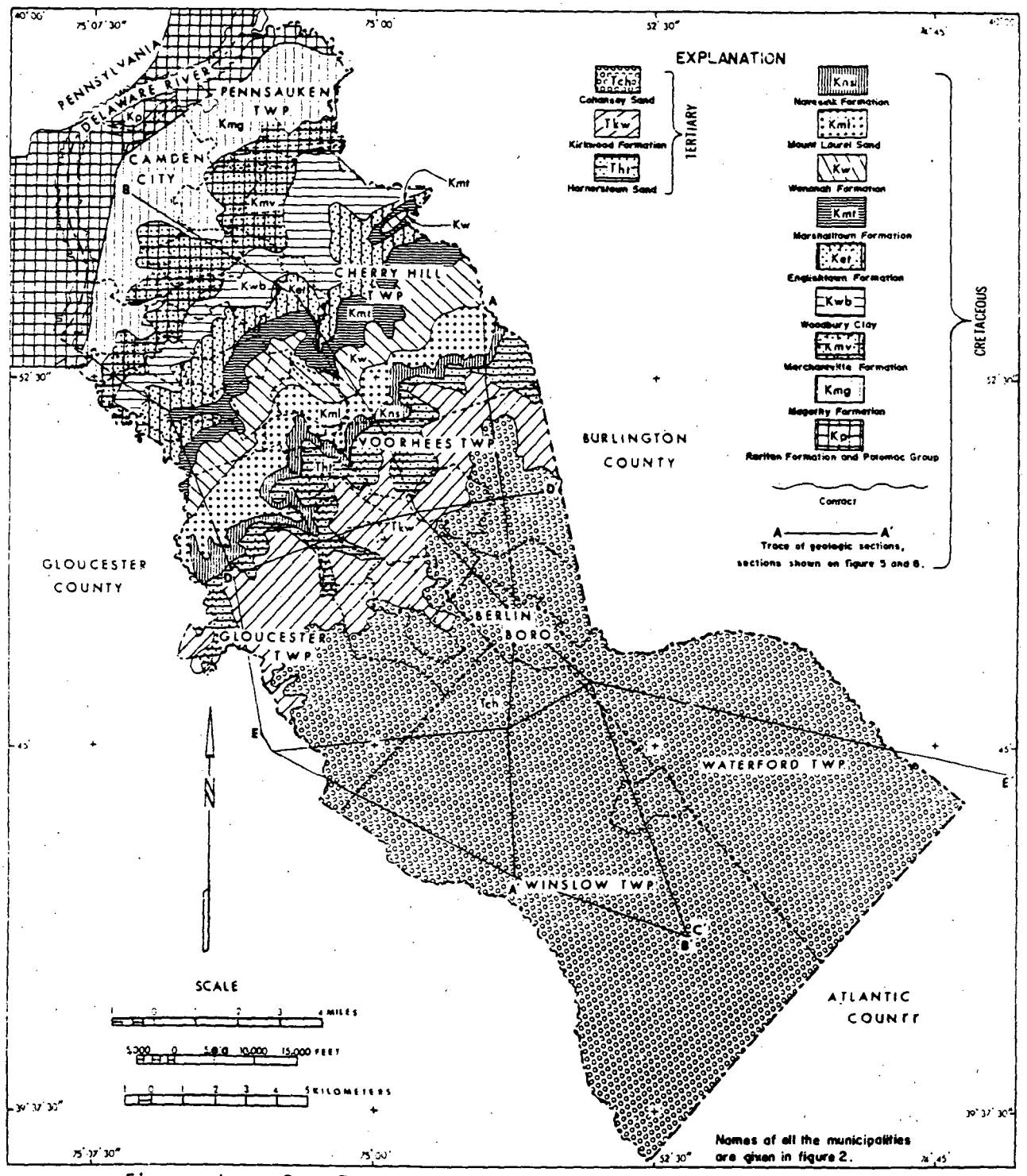


Figure 4. — Pre-Quaternary geologic map of Camden County.

sections of the Coastal Plain sediments in Camden County. The Cretaceous and Tertiary sediments dip gently to the southeast with the oldest sediments cropping out at the Delaware River. In general, the older the sediments are, the greater the dip. The Quaternary formations are essentially flat-lying beds that overlie the Cretaceous and Tertiary sediments.

Underlying the sediments of the Coastal Plain in Camden County are crystalline rocks of pre-Cretaceous age. The surface of the crystalline rocks slopes towards the southeast. The altitude of the crystalline rock surface is about 40 feet below mean sea level at the Delaware River in the yicinity of the Benjamin Franklin Bridge and about 2,800 feet below mean sea level at the Camden-Atlantic County line.

The formations present in Camden County and their water-bearing properties are described in table 2. Also given is the general lithology and range in thickness of the formations.

GEOLOGIC HISTORY

During the Precambrlan a great thickness of sediments was deposited in the area. The sediments included sands, silts, clays, and carbonates. The sediments were buried by additional sediments, metamorphosed, and subsequently uplifted during Paleozoic time. Part of the sediments were reconstituted into the metamorphic rocks known as the Wissahickon Formation. In the Camden County area a period of erosion occurred in the Paleozoic Era and continued into the Mesozoic Era, extending through Triassic and Jurassic time. The next sequence of sediments found are the Cretaceous units above the metamorphic rocks. During Cretaceous time sands, clays, and silts were deposited in a deltaic complex somewhat similar to modern deltas. The streams supplying sediment to the deltaic complex flowed from the west-northwest to the east-southeast. They provided the fluvial sediments that make up the Potomac Group and the Raritan and Magothy Formations. In Late Cretaceous time marine seas inundated the area. The marine invasions were cyclic in nature rather than continuous, and periods cf complete withdrawal of the sea occurred. During Late Cretaceous time deposits in the Camden area were mainly of deltaic, beach, and marine origin.

The marine environment persisted into Tertiary time, but the marine inundations were not as extensive as those in the Cretaceous. Early Tertiary deposits (Paleocene to Middle Eocene) are marine in origin; whereas, middle and late Tertiary

deposits (Miocene and Pliocene) are either beach or deltaic deposits.

Sands and gravels of fluvial origin were deposited during early Pleistocene time of the Quaternary Period in extensive areas of Camden County. These deposits, known as the Bridgeton and Pennsauken Formations, may be the result of several early glacial or interglaclal stages. In middle Pleistocene time sea level rose during interglaclal stage. This resulted in a marine invasion of the area along the Delaware River in Camden. Clays and silts were deposited in the low-lying areas while fluvial material such as sands and gravels were deposited in the higher areas.

As the Wisconsin ice sheet advanced into the northern parts of Pennsylvania and New Jersey, sea level declined and the sea withdrew from the Camden area. Glacial meltwaters deposited sands, silts, and clays. In addition, eclian materials were deposited. Sea level rose to its present level with the withdrawal of the Wisconsin glacier. Recent measurements of sea level suggest that it is still rising.

GROUND-WATER QUALITY

Ground water contains dissolved mineral matter as the result of leaching of soluble material, primarily from the soils, sediments, or rocks through which the water moves. Thus, the natural chemical characteristics of ground water are a function of time, pressure, temperature, composition, and solubility of the minerals with which the water is in contact. Consequently, the quality of ground water may very greatly from one place to another and from one aquifer to another. Superimposed on the natural chemical characteristics of ground water is deterioration of the quality of water caused by human activities, such as the utilization of unlined industrial-retention ponds, waste-disposal wells, and improperly located or constructed sanitary landfills and septic tanks.

Pumping also can have an effect on the local quality of ground water. Changes in the potentiometric surface caused by pumping may change the direction of movement of water or greatly accelerate the movement. Thus, ground water of poor quality may move into centers of pumping. Salt water also may move from adjacent aquifers or from tidal streams into the pumped aquifer.

Water-quality standards vary widely depending on the

intended use of the water. A particular industry may have requirements for water within a narrow range of a minor constituent. If the concentration is beyond this range the water may not be suitable for the particular use without treatment. The same water, however, may be acceptable for public-water supply. The Potable Water Standards of the New Jersey Department of Environmental Protection (1970) for some chemical constituents are as follows:

Chemical constituents	Maximum concentrations (mg/l)
Chloride (Cl)	250
Fluoride (F)	1.5
Hardness (as $CaCO_3$)	150
Iron (Fe)	.3
Manganese (Mn)	.05
Nitrate (NO_3-N)	30
Sodium (Na)	50
Sulfate (SO_4)	250
Dissolved solids	500

The source and significance of dissolved-mineral constituents and physical properties of ground water in Camden County are given in table 3.

Regional water-quality studies have been made for several aquifers in Camden County and vicinity. The aquifers are 1) Potomac-Raritan-Magothy aquifer system (Langmuir, 1969a and 1969b, and Gill and Farlekas, written commun., 1969); 2) the Englishtown aquifer (Seaber, 1965); and 3) the Cohansey Sand (Rhodehamel, 1966). Water-quality data for the neighboring counties are given in ground-water reports for Burlington (Rush, 1962 and 1963), Gloucester (Hardt and Hilton, 1969), and Atlantic Counties (Clark and others, 1968). The quality of water data for Camden County are given in table 4. The quality of water data for each aquifer is discussed under the appropriate sections of the individual formations.

GEOLOGIC FORMATIONS AND THEIR HYDROLOGIC CHARACTERISTICS

PRE-CRETACEOUS CRYSTALLINE ROCKS

Geology

Crystalline rocks of pre-Cretaceous age underlie the Coastal Plain sediments in Camden County. The crystalline rocks at or near the surface near Camden are part of the Wissahickon Formation. Much of the data available on the lithology and age of the rocks are from areas where the rocks are at or near the surface. Information about these rocks at depth is from drillers' logs and seismic studies.

The Wissahickon Formation is a medium to coarse-grained foliated crystalline rock that varies in composition and texture from schist to gneiss. The lithology of the formation varies greatly in both vertical and horizontal directions. The formation was probably a sedimentary series of sandstone, siltstone, and shale that have been deformed and re-crystallized by metamorphism.

The outcrop area of the Wissahickon Formation near the project area is in Pennsylvania a few miles west of the Delaware River. The formation is near the surface in the Camden City area near the Delaware River. The depth to the Wissahickon Formation at the Delaware River in the vicinity of the Benjamin Franklin Bridge is about 60 feet. The configuration of the crystalline rocks is shown in figure 7.

Hydrology

Few wells have been drilled for water supply in the crystalline rocks below the Coastal Plain of New Jersey. Two wells were drilled 600 feet into the Wissahickon Formation in Burlington County near the Delaware River. Neither well produced sufficient water to be useful to their owners. The data from these and other wells drilled into the crystalline rocks indicate that development of these rocks as a source cf a large ground-water supply is unlikely.

Although the crystalline rocks do not produce a large quantity of water, they are hydrologically important. The basement rocks form a basal confining unit for the overlying unconsolidated aquifers. In addition, the configuration of the bedrock surface is hydrologically important. During Cretaceous and pre-Cretaceous time streams incised major river channels in the bedrock surface. These west to east-trending channels are filled with highly permeable Coastal Plain sediments (Gill and Farlekas, written commun., 1969).

MESOZOIC ERATHEM

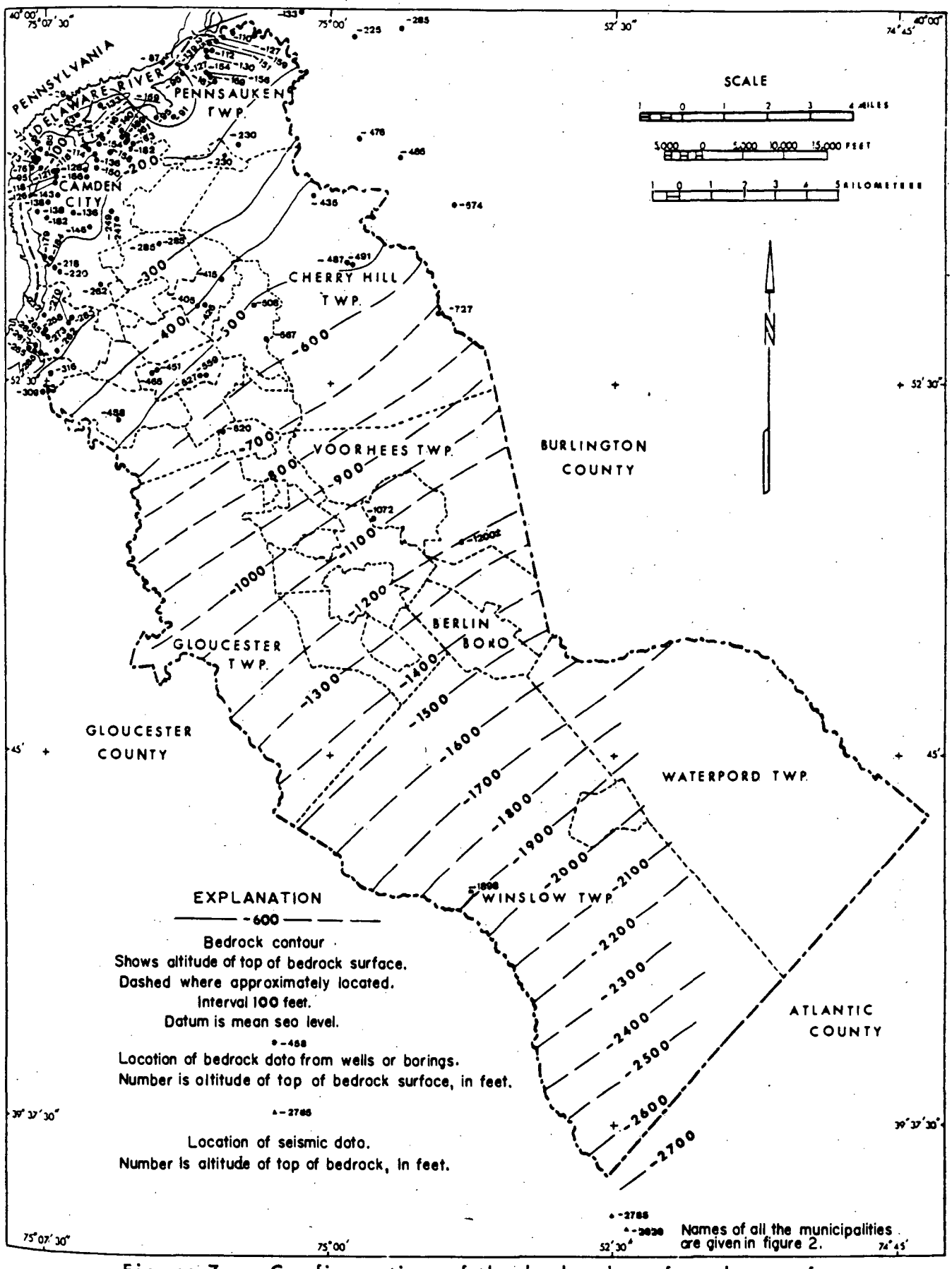


Figure 7. — Configuration of the bedrock surface beneath the Coastal Plain in Camden County.

Cretaceous System

Potomac Group and the Raritan and Magothy Formations

Regional Setting and Stratigraphic Framework

The Potomac Group and the Raritan and Magothy Formations are fluvial-marginal marine sediments of Early to Late Cretaceous age and overlie the pre-Cretaceous crystalline rocks. These sediments make up an extensive part of the Coastal Plain sediments in New Jersey and in the adjacent states. Major structures which contain the greatest thickness of sediments are the Salisbury embayment (Richards, 1945) in Delaware and the Raritan embayment in the vicinity of Raritan Bay and eastern Long Island. The area between these two embayments, which includes Camden County, contains smaller arches and troughs. The outcrop area of the Potomac Group and Raritan and Magothy Formations in Camden County (21 square miles in area) is in the northwestern part of the county near the Delaware River. The units are extensively overlain by permeable Pleistocene deposits in the outcrop area.

The Potomac Group and the Raritan and Magothy Formations form a wedge-shaped body that thickens in a downdip direction and is underlain by the crystalline basement. The configuration of the crystalline rocks is shown in figure 7. The upper limit of the wedge-shaped body is the contact between the Merchantville Formation and the top of the Magothy Formation (fig. 8). The difference between the basement and the top of the Magothy is the total thickness of Potomac Group and the Raritan and Magothy Formations (fig. 9).

In Camden County the thickness of the Potomac Group and Raritan and Magothy Formations ranges from approximately 260 feet at the Collingswood well 7 (CO 7), located near the outcrop area, to approximately 1,210 feet at the New Brooklyn Park east well (Wl 27). This is shown on the thickness map in figure 9. The distance between the two wells is 13 miles.

Correlation of part of the Cretaceous stratigraphic section in northern New Jersey and Maryland as determined by Wolfe and Pakiser (1971) is given below.

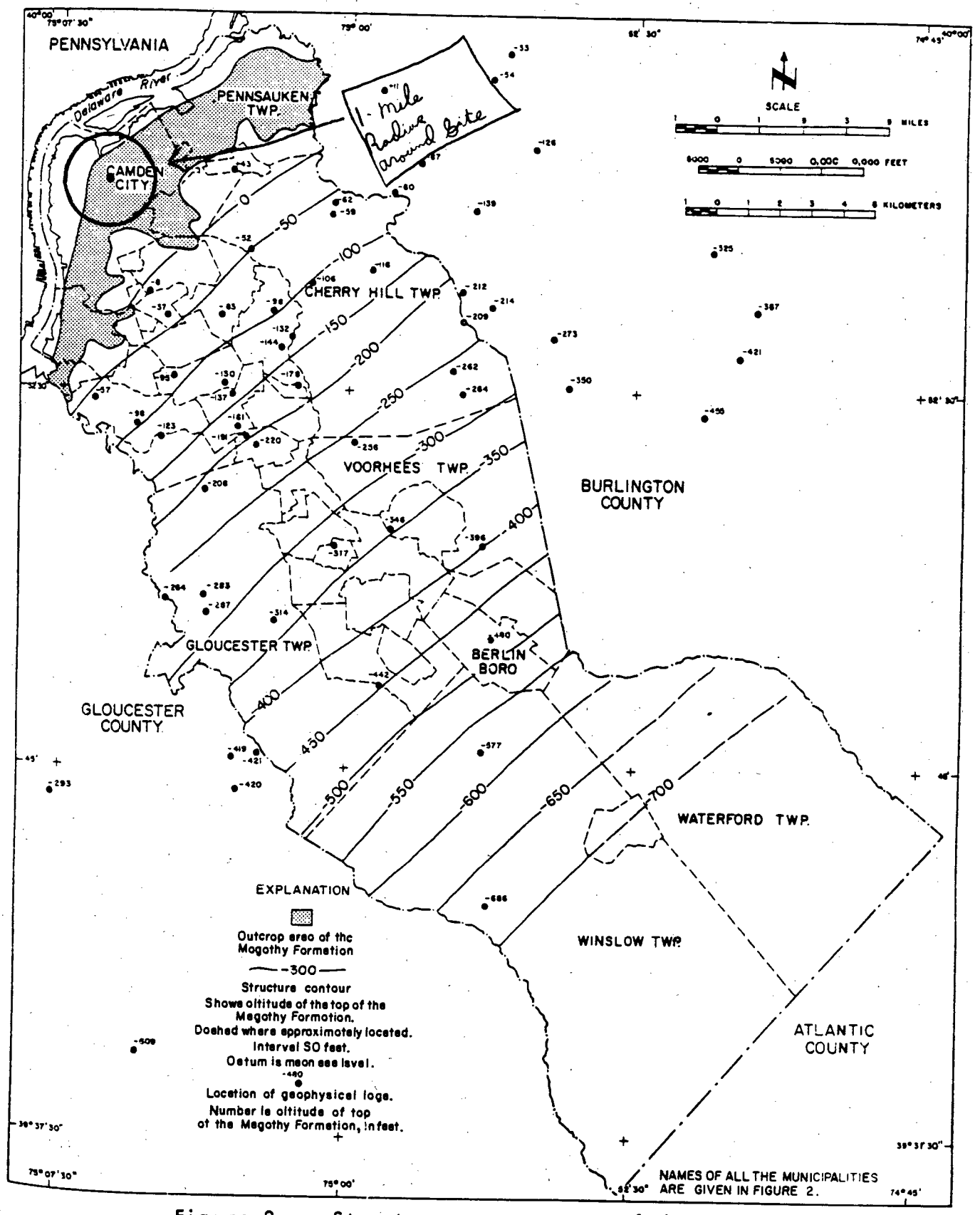


Figure 8. — Structure contour map of the top of the Magothy Formation in Camden County.

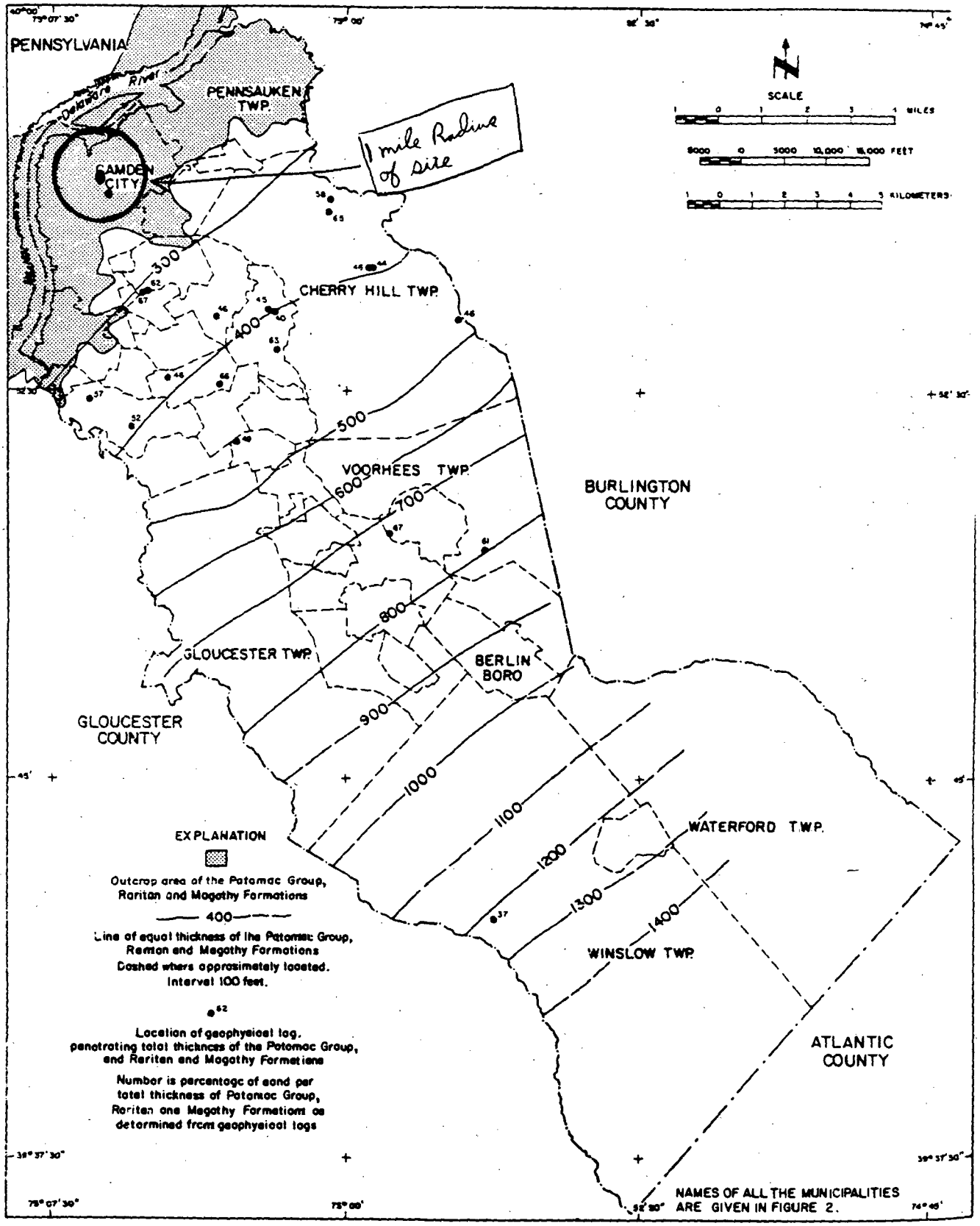
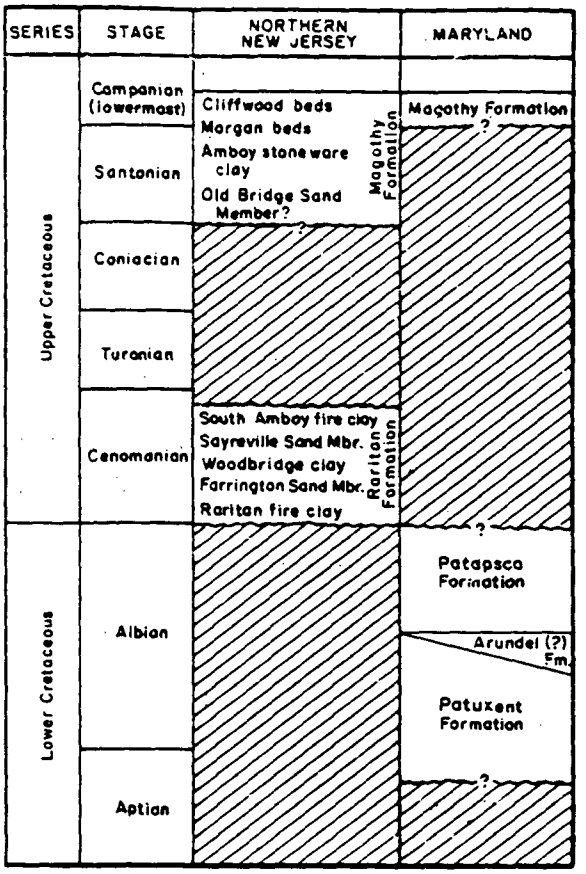


Figure 9. Thickness map of the Potomac Group and the Raritan and Magothy Formations in Camden County.



The lowermost part of the stratigraphic section, the Potomac Group, consists of the Patuxent, Arundel, and Patapsco Formations at the type locality in Maryland. Palynological studies of samples from three sites from the Camden County area by Wolfe and Pakiser (1971) and L. A. Sirkin (written commun., 1971) indicate that only the Upper Patapsco was found at two of the three sites. Berry (1911), from a study of megafossil flora, determined that the sample from a site in the outcrop near Camden is Upper Raritan. However, Wolfe and Pakiser (1971) who examined a sample from the same site indicate an uppermost Patapsco age based on palynologic data. According to Sirkin (written commun., 1971) the uppermost Patapsco can be found at Medford test well (ME 1), but not at the New Brooklyn Park test weli (Wl 27).

The Raritan Formation at the type locality at Raritan Bay, Middlesex County, was divided into seven units by Ries, Kümmel, and Knapp (1904) and later modified by Berry (1906). Barksdale and others (1943) assigned names to the three sand members. Recent palynological work by Wolfe and Pakiser (1971) and Doyle (1969) indicate that the upper two units, the Amboy stoneware clay and the Old Bridge Sand, are of Magothy age. Wolfe and Pakiser (1971) reassigned the Old Bridge Sand as the basal member of the Magothy Formation. However, the members of the Raritan Formation of the type area in Raritan Bay cannot be traced to the Delaware Valley as distinct lithologic units. Palynologic analysis of core samples from the New Brooklyn test well (Wl 27) and the Medford test well (ME 1) indicate the Raritan Formation is present at the two sites (Sirkin, written commun., 1971).

The Magothy Formation in the Raritan Bay area has been re-examined by Owens, Minard, and Sohl (1968). Based on the then unpublished work of Wolfe and Pakiser (1971), Owens, Minard, and Sohl (1968) defined the Magothy as consisting of four units. The total thickness of the Magothy Is more than 200 feet in the Raritan Bay area. Members of the Magothy Formation of the Raritan Bay area are not recognizable in the Delaware Valley. Palynological studies by Sirkin (written commun., 1971) indicate that there is about 300 feet of Magothy age sediments at New Brooklyn Park test well (WI 27) and about 100 feet at the Medford test well (ME 1).

Depositional Environment

The Potomac Group and the Raritan and Magothy Formations were deposited in a complex fluvial-deltaic environment (Owens and others, 1968). Figure 10 illustrates the idealized sand-dispersal system showing the various depositional environments for the Eocene deltas of Texas (Fisher and McGowen, 1969). The authors believed that the fluvial-deltaic sediments of the Potomac Group and the Raritan and Magothy Formations have a similar complex depositional history.

In the Camden area the sediments were deposited as part of the ancestral Schuylkill fluvial-deltaic system (Gill and Farlekas, written commun., 1969). Troughs in the bedrock surface represent erosional features that are of Late Cretaceous age or older. These troughs, filled mainly with coarse sands and gravels, have been delineated in Philadelphia by Greenman and others (1961). The sediments were deposited during Cretaceous time in the fluvial part of the system, which

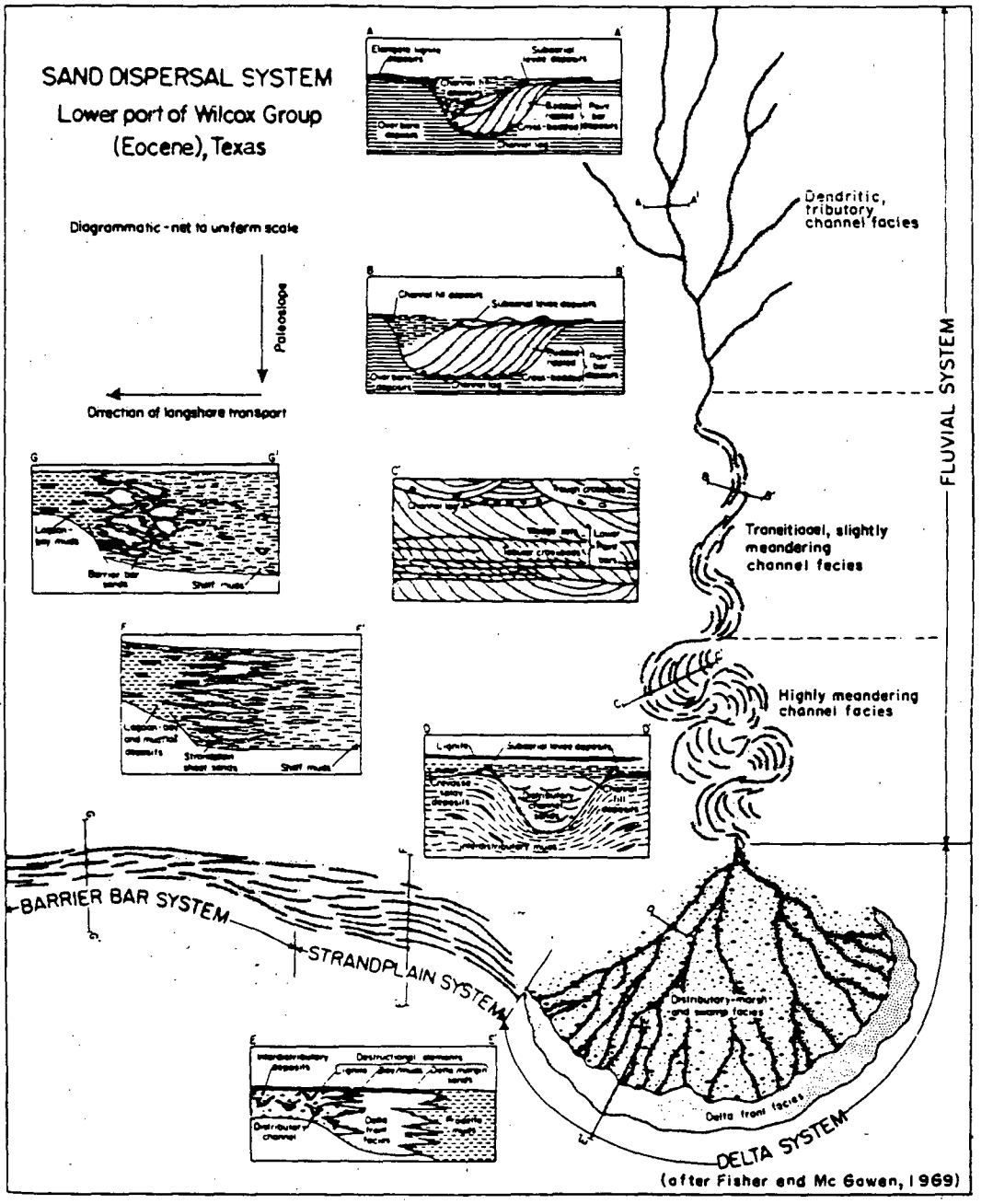


Figure 10. — idealized sand-dispersal system in various depositional systems, Wilcox Group, Texas.

probably extended from Philadelphia to the area updip from New Brooklyn Park.

A thickness map of the Potomac Group and the Raritan and Magothy Formations is given in figure 9. Also shown is the percentage of sand as estimated from geophysical logs from wells that penetrate the section from the top of the Magothy to the crystalline rocks. The thickness lines show the thickening of the sediments downdip. The percentage of sand indicates greater values in the updip area and lower values in the downdip area. The estimated percentage of sand at the New Brooklyn Park well (Wl 27) is 37. Based on the depositional concept developed by Fisher and McGowen (1969) the New Brooklyn Park well is interpreted as being in the distributary channel-marsh and swamp facies. The sediments found in the Haddonfield area are interpreted as including the transitional, slightly meandering channel facies of Fisher and McGowen (1969). The dendritic tributary channel facies is interpreted as occurring in the area from Philadelphia to the northern part of Camden County. The highly meandering channel facies probably occurs in the area downdip from Elm Tree Farms well (VO 12). Lack of data prevents the delineation of the extent of this facies downdip of the Elm Tree Farms area.

Particle-size analysis is available for samples from the New Brooklyn Park test well (Wl 27) in Winslow Township (table 5). The particle-size analysis shows the predominant silt and clay values.

Hydrology

The most productive source of ground water in Camden County is the Potomac-Raritan-Magothy aquifer system. The aquifer system is made up of aquifers consisting of sand with some gravel and confining units consisting of silts and clays and is overlain in the outcrop area by highly permeable Pleistocene sand and gravel. The sands are separated into three hydrologic units, an upper, middle, and lower aquifer. The upper unit consists mainly of the sands of the Magothy Formation. The middle and lower units consist mainly of sands of the Raritan Formation and the Potomac Group. The thickness of the three hydrologic units are shown in figures 11, 12, and 13. The lower aquifer in the outcrop area is overlain by and hydraulically connected to the Pleistocene deposits and is a water-table aquifer in Philadelphia. The upper aquifer in the outcrop area is overlain by and hydraulically connected to the Pleistocene deposits in Camden County and is under water-table conditions.

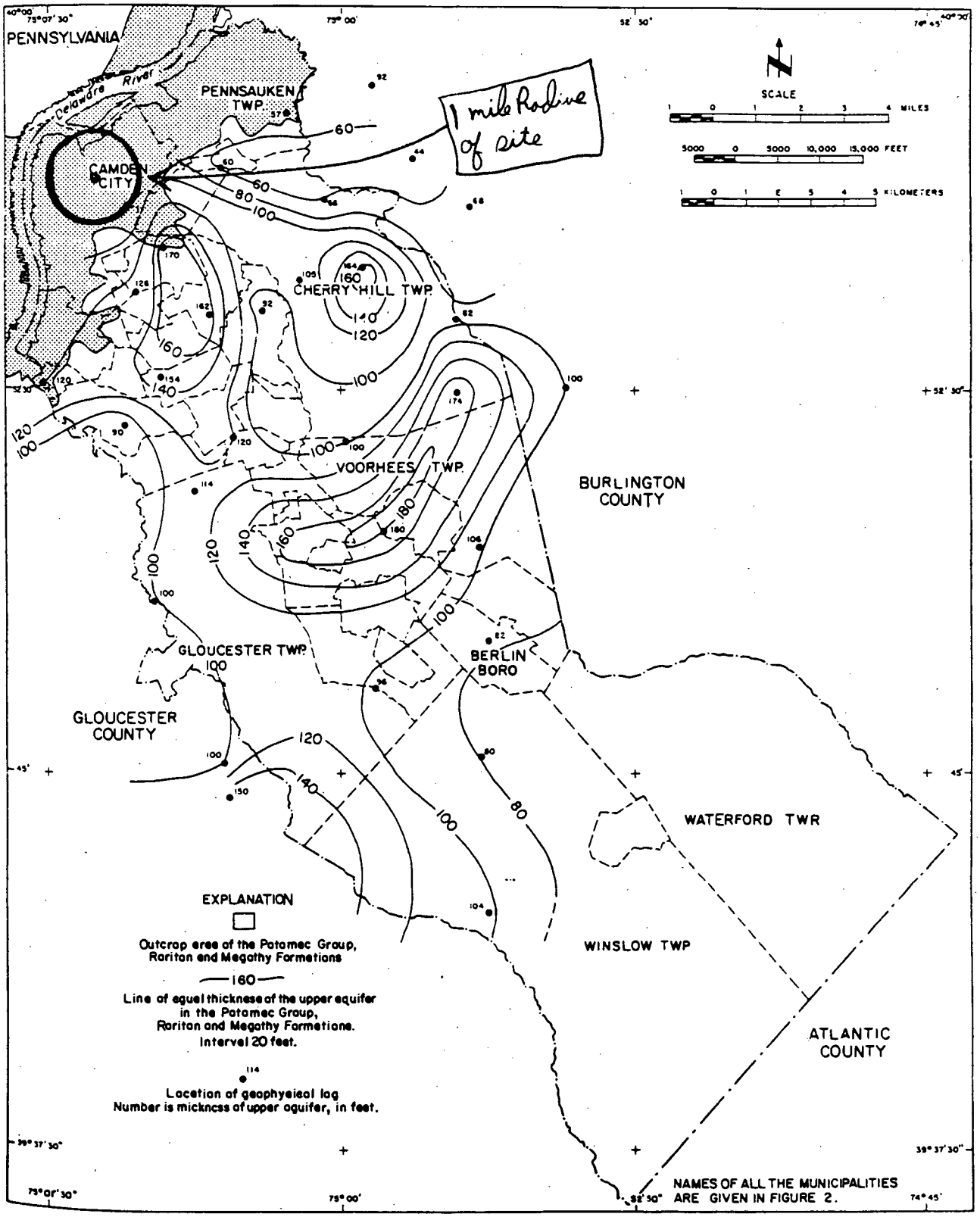


Figure 11. — Thickness map of the upper aquifer in the Potomac-Raritan-Magothy aquifer system in Camden County.

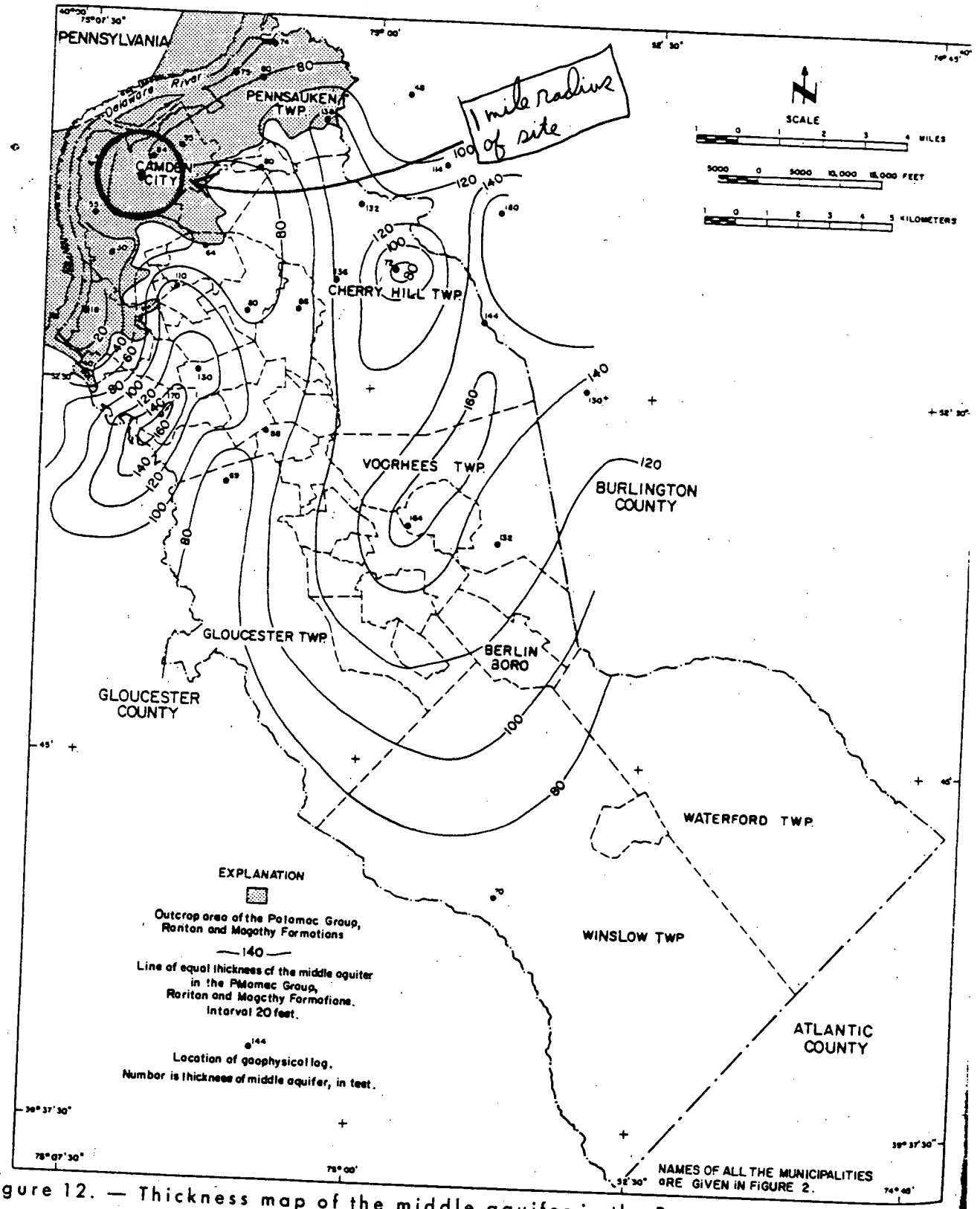


Figure 12. — Thickness map of the middle aquifer in the Potomac-Raritan-Magothy aquifer system in Camden County.

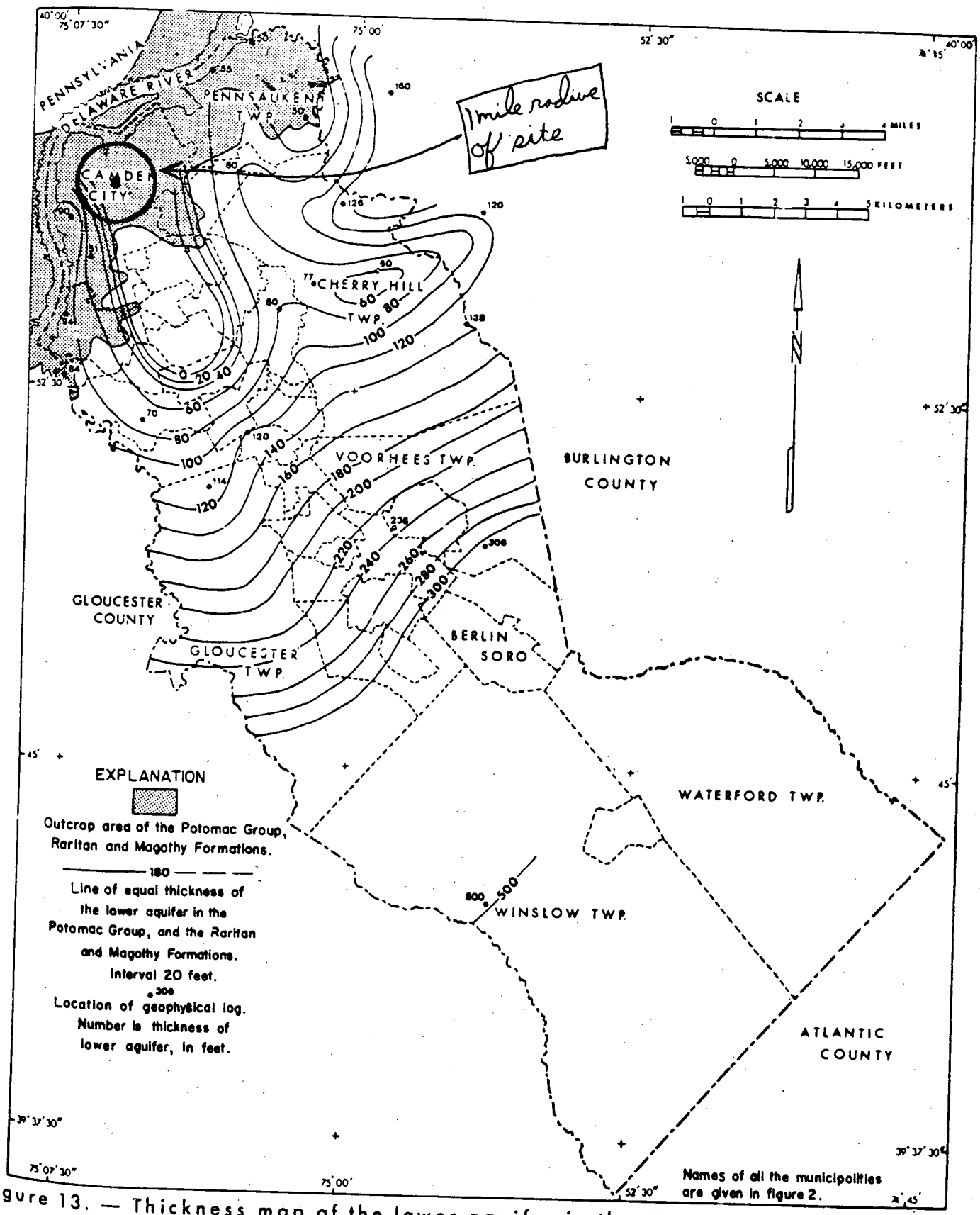


Figure 13. — Thickness map of the lower aquifer in the Potomac-Raritan-Magothy aquifer system in Camden County.

Table 1.--Records of selected wells in Camden County and vicinity--Continued

MAP NUMBER	MUNICIPALITY	LAT-LONG	OWNER	LOCAL WELL NUMBER	DATE DRILLED (YEAR)	ALTITUDE OF LSD (FT)	CASING DEPTH (FT)	WELL DEPTH (FT)
			CAMDEN COUNTY					
CA-19	CAMDEN CITY	395706N0750553.1	CAMDEN CITY W O	CITY 16	1954	23	149	179
CA-20	CAMDEN CITY	395659N0750610.1	CAMDEN CITY W O	CITY 9	1957	9	116	146
CA-21	CAMDEN CITY	395659N0750610.2	CAMDEN CITY W O	TEST WELL 1950	1950	5	129	150
CA-22	CAMDEN CITY	395659N0750610.3	CAMDEN CITY W O	CITY 9-1924	1924	9	106	146
CA-23	CAMDEN CITY	395652N0750607.1	CAMDEN CITY W O	CITY 10	1935	10	126	158
CA-24	CAMDEN CITY	395649N0750743.1	ESTERBROOK PEN	ESTERBROOK DOS	--	8	--	300
CA-25	CAMDEN CITY	395640N0750622.1	CAMDEN CITY W O	CITY 1-1940	1940	5	135	168
CA-26	CAMDEN CITY	395638N0750622.1	CAMDEN CITY W O	CITY 14	1953	10	135	170
CA-27	CAMDEN CITY	395638N0750622.2	CAMDEN CITY W O	CITY 1-1922	1922	5	146	174
CA-28	CAMDEN CITY	395617N0750710.1	CAMDEN CITY W O	CITY 12	1945	23	136	166
CA-29	CAMDEN CITY	395415N0750633.1	CAMDEN CITY W O	CITY 5N	1963	22	134	169
CA-30	CAMDEN CITY	395614N0750633.2	CAMDEN CITY W O	CITY 5-1937	1937	22	142	172
CA-31	CAMDEN CITY	395614N0750633.1	CAMDEN CITY W O	CITY 5-1928	1928	22	152	171
CA-32	CAMDEN CITY	395604N0750735.1	PUBLIC SERV E G	6 REPLACEMENT	1954	5	118	145
CA-33	CAMDEN CITY	395603N0750736.1	PUBLIC SERV E-G	PSEGC 8	1955	4	119	145
CA-34	CAMDEN CITY	395602N0750744.1	PUBLIC SERV E-G	PSEGC 7	1947	4	116	145
CA-35	CAMDEN CITY	395557N0750629.1	CAMDEN CITY W O	CITY 3A	1953	15	91	115
CA-36	CAMDEN CITY	395557N0750629.2	CAMDEN CITY W O	CITY 3-1934	1934	15	91	113
CA-37	CAMDEN CITY	395557N0750629.3	CAMDEN CITY W O	CITY 3-1922	1922	15	85	110
CA-38	CAMDEN CITY	395552N0750535.1	CAMDEN CITY W O	CITY 13	1953	30	185	225
CA-39	CAMDEN CITY	395551N0750725.1	PUBLIC SERV E-G	PSEGC 14	1950	5	120	146
CA-40	CAMDEN CITY	395550N0750729.1	CAMDEN CITY W O	CITY 2R	1953	8	111	136
CA-41	CAMDEN CITY	395544N0750533.1	CAMDEN CITY W O	CITY 17	1954	34	230	265
CA-42	CAMDEN CITY	395541N0750622.1	CAMDEN CITY W O	CITY 4	1950	41	131	156
CA-43	CAMDEN CITY	395541N0750622.2	CAMDEN CITY W O	CITY 4-1935	1935	40	121	156
CA-44	CAMDEN CITY	395541N0750622.3	CAMDEN CITY W O	CITY 4-1922	1922	40	--	--
CA-45	CAMDEN CITY	395540N0750742.1	CAMDEN CITY W O	CITY 8	1928	6	150	175
CA-46	CAMDEN CITY	395540N0750742.2	CAMDEN CITY W O	CITY 8A	1953	6	89	124
CA-47	CAMDEN CITY	395539N0750600.1	W JERSEY HOSP	W JERSEY HOSP1	1958	30	119	140
CA-48	CAMDEN CITY	395539N0750541.1	OLDL HOSPITAL	STAND BY WELL	1963	30	241	258
CA-49	CAMDEN CITY	395534N0750724.1	GALLAGHERS WHSE	EVRSN LVRNG 1	1929	10	--	170
CA-50	CAMDEN CITY	395532N0750720.1	GALLAGHERS WHSE	EVRSN LVRNG 2	1933	10	145	171
CA-51	CAMDEN CITY	395530N0750719.1	GALLAGHERS WHSE	EVRSN LVRNG 5	1929	10	--	203
CA-52	CAMDEN CITY	395528N0750538.1	A N STOLLWRECK	2	1950	23	111	131
CA-53	CAMDEN CITY	395527N0750646.1	CAMDEN CITY W O	CITY 6N	1948	14	111	136
CA-54	CAMDEN CITY	395527N0750646.2	CAMDEN CITY W O	CITY 6-1928	1928	14	111	135
CA-55	CAMDEN CITY	395523N0750729.1	CAMDEN CITY	SEWAGE PLANT 1	1954	9	163	193
CA-56	CAMDEN CITY	395512N0750640.1	CAMDEN CITY W O	CITY 11	1942	13	124	154
CA-57	CAMDEN CITY	395502N0750655.1	CAMDEN BREWERY	--	--	15	160	180
CA-58	CAMDEN CITY	395457N0750641.1	CAMDEN CITY W O	CITY 7	1945	21	126	160
CA-59	CAMDEN CITY	395457N0750641.2	CAMDEN CITY W O	CITY 7-1928	1928	21	126	164
CA-60	CAMDEN CITY	395457N0750640.1	CAMDEN CITY W O	CITY 7N	1966	21	123	163
CA-61	CAMDEN CITY	395455N0750716.1	SO JRSY PORT CM	NY SHIP 7	1942	12	187	229
CA-62	CAMDEN CITY	395449N0750716.1	SO JRSY PORT CM	NY SHIP 6	1941	12	119	225
CA-63	CAMDEN CITY	395447N0750711.1	SO JRSY PORT CM	NY SHIP 5A	1940	12	87	104
CA-64	CAMDEN CITY	395435N0750720.1	SO JRSY PORT CM	NY SHIP PW 1	1956	12	50	124
CA-65	CAMDEN CITY	395427N0750606.1	CAMDEN CITY W O	WATER WORKS T1	1942	15	247	300
CH-1	CHERRY HILL TWP	395621N0745840.1	ANTHONY MALAORA	--	1955	60	--	115
CH-2	CHERRY HILL TWP	395615N0750027.1	NJ WATER CO	COLUMBIA 22	1960	39	371	453
CH-3	CHERRY HILL TWP	395615N0750027.1	NJ WATER CO	COLUMBIA 24	1961	34	153	167
CH-4	CHERRY HILL TWP	395613N0750052.1	JERRY SCHAEFER	1	1965	45	100	105
CH-5	CHERRY HILL TWP	395612N0750142.1	RADIO CORP AMER	RCA 1	1955	128	220	--
CH-6	CHERRY HILL TWP	395606N0750148.1	GS RACING ASSCT	CHRY HLL INN 1	1954	80	--	179
CH-7	CHERRY HILL TWP	395606N0750148.2	GS RACING ASSCT	CHRY HLL INN 2	1967	60	148	172
CH-8	CHERRY HILL TWP	395603N0750041.1	NJ WATER CO	COLUMBIA 31	1967	45	376	427
CH-9	CHERRY HILL TWP	395556N0745924.1	M MOLZER	--	1953	75	178	133
CH-10	CHERRY HILL TWP	395530N0750301.1	E M ELLIS SON	1	1949	23	158	168
CH-11	CHERRY HILL TWP	395514N0750213.1	GARDEN STATE PK	RACE TRACK	--	25	128	158
CH-12	CHERRY HILL TWP	395511N0750202.1	WIDELL AND SONS	--	1953	27	125	135
CH-13	CHERRY HILL TWP	395502N0750221.1	N J NATIONAL GO	1	1956	10	97	111
CH-14	CHERRY HILL TWP	395455N0745929.1	NJ WATER CO	KINGSTON 25	1961	44	309	367
CH-15	CHERRY HILL TWP	395455N0745923.2	NJ WATER CO	KINGSTON 28	1964	44	175	207
CH-16	CHERRY HILL TWP	395455N0745924.1	NJ WATER CO	KINGSTON 27	1963	40	365	417
CH-17	CHERRY HILL TWP	395452N0750035.1	W J OSTERTAG	1	1953	55	87	115
CH-18	CHERRY HILL TWP	395442N0750103.1	NJ WATER CO	ELLISBURG 13	1960	39	491	527
CH-19	CHERRY HILL TWP	395441N0750104.1	NJ WATER CO	ELLISBURG 16	1957	39	187	220
CH-20	CHERRY HILL TWP	395438N0750107.1	NJ WATER CO	ELLISBURG 23	1960	32	318	375
CH-21	CHERRY HILL TWP	395422N0745641.1	OEEH PARK FIRE	CO 1	1954	70	252	258
CH-22	CHERRY HILL TWP	395419N0745721.1	FRANK POWERS	--	1949	72	310	320
CH-23	CHERRY HILL TWP	395409N0750048.1	P A VATTER	--	1953	64	224	234
CH-24	CHERRY HILL TWP	395409N0745957.1	ROSERT COLEMAN	--	195-	17	98	108
CH-25	CHERRY HILL TWP	395406N0745841.1	ARNOLD PALMER	DRIVING RANGE	1964	60	275	285
CH-26	CHERRY HILL TWP	395356N0745708.1	NJ WATER CO	OLC ORCHARD A	1967	71	743	748
CH-27	CHERRY HILL TWP	395356N0745708.2	NJ WATER CO	OLO ORCHARD B	1967	71	328	342
CH-28	CHERRY HILL TWP	395356N0745708.3	NJ WATER CO	OLO ORCHARD C	1967	71	487	500
CH-29	CHERRY HILL TWP	395356N0745708.4	NJ WATER CO	OLO ORCHARD 36	1968	8	299	349
CH-30	CHERRY HILL TWP	395356N0745708.5	NJ WATER CO	OLO ORCHARD 37	1968	6	454	488
CH-31	CHERRY HILL TWP	395356N0745708.6	NJ WATER CO	OLO ORCHARD 38	1968	72	443	493
CH-32	CHERRY HILL TWP	395331N0745920.1	A R ROSS	1	1950	100	125	135
CH-33	CHERRY HILL TWP	395321N0745617.1	EUGENE MILLER	1	1954	92	360	370

Table 1.--Records of selected wells in Camden County and vicinity--Continued

MAP NUMBER	LENGTH OF WELL OPEN TO AQUIFER (FEET)	DEPTH TO CONSOLI-DATED ROCK (FT)	CASING DIAM-ETER (IN)	WATER LEVEL (FT)	DATE WATER LEVEL MEASURED	YIELD (GPM)	DRAW DOWN (FT)	SPECIFIC CAPACITY	PUMPING PERIOD (HOURS)	USE OF WATER	MAJOR AQUIFER
					CAMDEN COUNTY						
CA-19	30	--	18	50	12-54	1130	53	21.3	8	P	K3 MR
CA-20	30	146	18	48	11-57	1020	53	19.2	--	P	K3 MR
CA-21	21	166	6	23	7-50	300	57	5.3	--	U	K3 MR
CA-22	40	146	26	15	3-24	1420	72	19.7	--	P	K3 MR
CA-23	30	150	18	57	11-57	1020	32	31.9	--	P	K3 MR
CA-24	--	--	6	--	--	--	--	--	--	U	WG
CA-25	32	--	18	--	--	--	--	--	--	P	K3 MR
CA-26	35	--	18	-2	12-53	1000	54	18.5	8	P	K3 MR
CA-27	39	--	26	12	10-22	1050	67	15.7	--	P	K3 MR
CA-28	30	--	16	32	-45	857	74	11.6	--	P	K3 MR
CA-29	35	--	18	58	10-63	1000	32	31.2	--	P	K3 MR
CA-30	30	--	18	--	--	--	--	--	--	P	K3 MR
CA-31	19	--	26	31	8-28	1100	37	29.7	--	P	K3 MR
CA-32	32	--	8	35	12-54	350	25	14.0	26	N	K3 MR
CA-33	26	--	--	--	--	--	--	--	--	N	K3 MR
CA-34	29	--	--	--	--	--	--	--	--	N	K3 MR
CA-35	25	--	19	37	12-55	1000	46	21.7	3	P	K3 MR
CA-36	22	--	18	--	--	--	--	--	--	P	K3 MR
CA-37	24	--	26	15	5-22	1160	55	21.1	--	P	K3 MR
CA-38	40	--	18	46	6-53	1000	24	41.7	--	P	K3 MR
CA-39	26	--	10	31	5-50	506	34	14.9	12	N	K3 MR
CA-40	25	190	13	41	12-54	1000	46	21.7	8	P	K3 MR
CA-41	35	--	18	64	7-58	1250	32	39.1	3	P	K3 MR
CA-42	25	--	18	77	11-57	1000	27	37.0	--	P	K3 MR
CA-43	35	--	18	56	8-35	1200	34	35.3	--	P	K3 MR
CA-44	--	--	--	--	--	--	--	--	--	P	K3 MR
CA-45	25	--	18	21	4-28	1085	52	20.9	--	P	K3 MR
CA-46	35	--	19	12	7-53	1000	30	33.3	8	P	K3 MR
CA-47	21	--	8	52	12-58	205	58	3.5	8	T	K3 MR
CA-48	21	--	8	68	9-63	275	11	25.0	4	T	K3 MR
CA-49	--	--	4	--	--	150	--	--	--	N	K3 MR
CA-50	26	--	8	--	--	300	--	--	--	N	K3 MR
CA-51	--	--	12	--	--	--	--	--	--	N	K3 MR
CA-52	20	--	8	52	2-50	210	8	26.2	3	N	K3 MR
CA-53	25	--	13	39	2-48	1012	31	32.6	8	P	K3 MR
CA-54	25	--	26	13	9-28	1100	47	25.1	--	P	K3 MR
CA-55	--	201	10	36	1-54	907	--	--	--	U	K3 MR
CA-56	30	--	16	32	9-42	1005	30	33.5	8	P	K3 MR
CA-57	20	--	--	--	--	--	--	--	--	N	K3 MR
CA-58	40	--	19	49	7-48	775	47	16.5	--	P	K3 MR
CA-59	38	--	26	29	9-29	1000	38	26.3	--	P	K3 MR
CA-60	40	--	18	50	6-66	1023	21	48.7	8	P	K3 MR
CA-61	42	--	12	35	5-43	1005	57	17.6	--	U	K3 MR
CA-62	26	--	10	28	3-41	830	81	10.2	--	N	K3 MR
CA-63	17	--	8	28	4-41	533	37	14.4	--	U	K3 MR
CA-64	62	--	16	17	1-56	--	56	--	40	N	K3 MR
CA-65	--	--	6	27	5-42	--	--	--	--	U	K3 MR
CM-1	--	--	--	55	1-55	15	--	--	2	M	KJ MV
CM-2	32	--	12	57	3-60	1067	49	21.8	8	P	K3 MR
CM-3	14	--	12	26	--	1051	44	23.9	8	P	K3 MR
CM-4	5	--	4	50	1-65	20	10	2.0	5	M	K3 MR
CM-5	--	--	6	48	--	50	--	--	4	N	K3 MR
CM-6	25	--	8	92	9-54	400	43	9.3	10	U	K3 MR
CM-7	24	--	12	--	--	--	--	--	--	I	K3 MR
CM-8	47	--	12	85	1-67	1030	57	18.1	26	--	K3 MR
CM-9	5	--	4	45	3-53	15	10	1.5	2	M	K3 MR
CM-10	10	--	5	25	4-49	15	20	0.7	6	N	K3 MR
CM-11	30	--	--	--	--	--	--	--	--	I	K3 MR
CM-12	10	--	6	25	3-53	60	--	--	6	M	K3 MR
CM-13	5	--	6	36	5-56	150	14	10.7	●	T	K3 MR
CM-14	58	528	12	69	9-61	1000	--	--	●	P	K3 MR
CM-15	26	--	12	82	10-64	857	70	12.2	●	P	K3 MR
CM-16	52	531	12	73	12-63	812	70	11.6	8	P	K3 MR
CM-17	--	--	8	74	10-53	25	--	--	2	M	K3 MV
CM-18	36	--	10	54	4-53	1200	50	26.0	8	P	K3 MR
CM-19	33	--	12	59	11-57	1000	62	16.1	5	P	K3 MR
CM-20	57	--	12	62	5-60	1001	34	29.4	8	P	K3 MR
CM-21	6	--	4	85	11-54	20	15	1.3	2	M	K3 MR
CM-22	10	--	5	60	12-49	100	20	5.0	6	M	K3 MR
CM-23	10	--	3	80	2-53	40	--	--	4	M	K3 MR
CM-26	10	--	4	43	5-53	40	17	2.6	--	M	K3 MV
CM-25	10	--	4	90	5-64	50	10	5.0	--	I	K3 MR
CM-26	5	807	2	107	3-67	--	--	--	--	U	K3 MR
CM-27	5	--	3	110	3-67	--	--	--	--	U	K3 MR
CM-28	5	--	3	109	--	--	--	--	--	U	K3 MR
CM-29	50	--	12	123	4-68	703	116	6.1	26	P	K3 MR
CM-30	34	--	12	109	4-68	1209	47	25.7	24	P	K3 MR
CM-31	50	--	12	113	5-68	1455	49	29.7	24	P	K3 MR
CM-32	--	--	6	63	9-50	250	--	--	--	M	K3 ET
CM-33	10	--	6	92	7-54	200	18	11.1	6	M	K3 MR

REFERENCE NO. 7

PRELIMINARY ASSESSMENT
OFF SITE RECONNAISSANCE
INFORMATION REPORTING FORM

Date: 1-10-89

Site Name: Borden Chemical Printing TDD: 02-8901-17

Site Address: 1625 Federal St.
Street, Box, etc.

Camden
Town

Camden
County

N. J.
State

NUS Personnel:

Name	Discipline
Kurt Fiedler	technician
Diane Trube	geologist
Joe Dvorak	chemist

Weather Conditions (clear, cloudy, rain, snow, etc.):

Clear, 40°,

Estimated wind direction and wind speed: 0-5mph

Estimated temperature: 40°

Signature: Kurt Fiedler Date: 1-11-89

Countersigned: D Trube Date: 1/11/89

PRELIMINARY ASSESSMENT

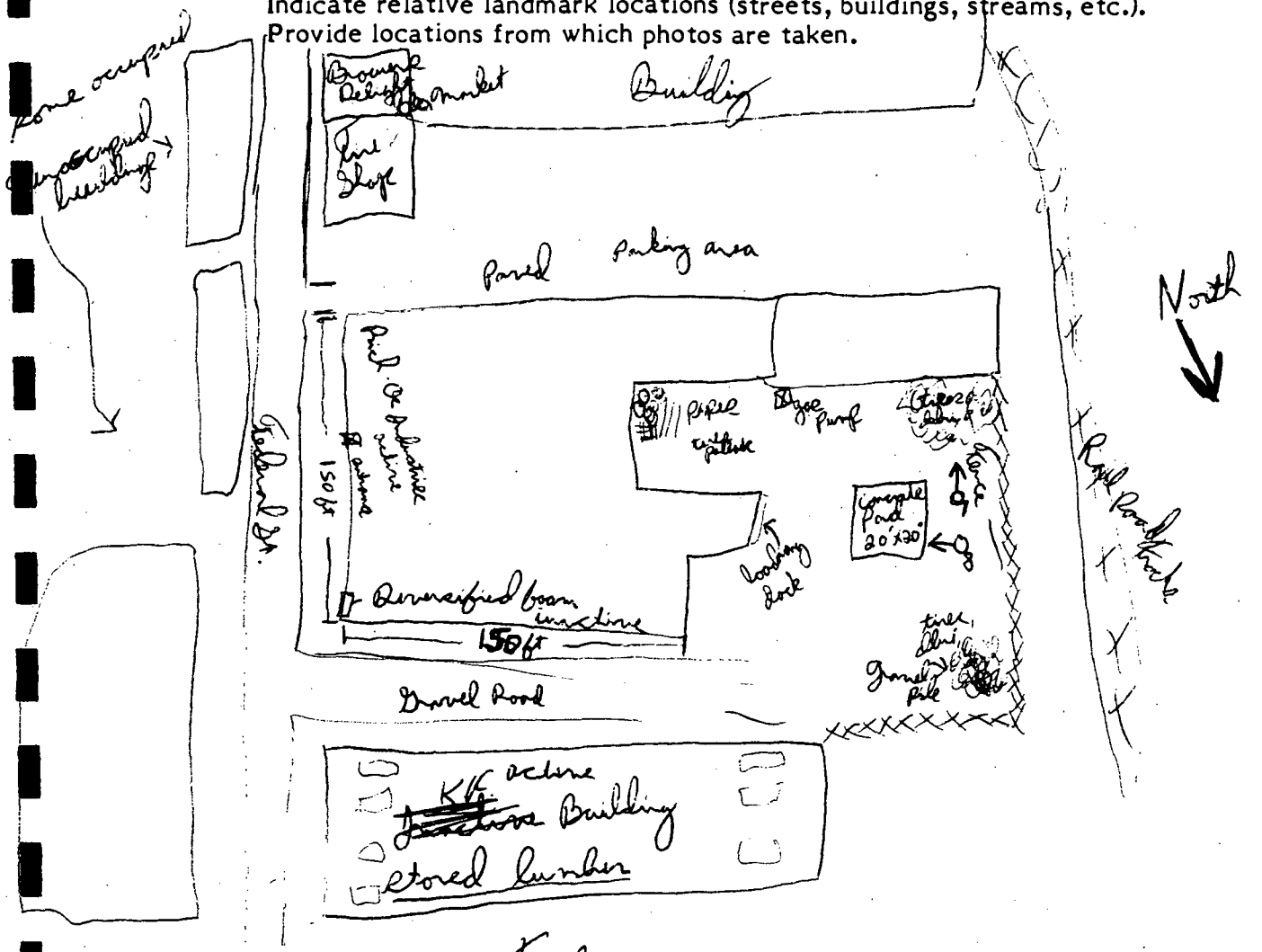
INFORMATION REPORTING FORM

Date: 1-11-89

Site Name: Borden Chemical TDD: 02890117

Site Sketch:

Indicate relative landmark locations (streets, buildings, streams, etc.). Provide locations from which photos are taken.



Signature: Kurt Fendle Date: 1-11-89

Countersigned: Diane Fricke Date: 1/11/89

PRELIMINARY ASSESSMENT

INFORMATION REPORTING FORM

Date: 1-11-89

Site Name: Borden Chemical TDD: 02-8901-17

Notes (Periodically indicate time of entries in military time):

0950 Railroad tracks border the ~~northern~~ western (back) side. Debris are scattered throughout the area behind building. Truck tires, pallets, piping and broken up black top. Loading dock in rear. Back area unpaved except for 20x20' concrete pad section. No direct migration route to Cooper River. North side of building ~~west~~ along access road is inactive but a sign (Diversified Foam) is at the entrance. The eastern side appears active. Entrance facing Federal Street. (Rich-Oz Industries) South side is paved parking lot and active tire shop and thrift store. North side ~~west~~ building is active lumber storage.

Rich-Oz Industries owns building at 1625 Federal St. (609)-541-1427 Building appears active.

Leaving site at 0958

Diversified Foam

Signature: Kurt Fiedler Date: 1-11-89

Countersignature: Diane Lubo Date: 1/11/89

PRELIMINARY ASSESSMENT

INFORMATION REPORTING FORM

Date: _____

Site Name: _____ TDD: _____

Notes (Cont'd):

DT 1/11/89

Attach additional sheets if necessary. Provide site name, TDD number, signature, and countersignature on each.

Signature: _____ Date: _____

Countersignature: _____ Date: _____

PRELIMINARY ASSESSMENT

INFORMATION REPORTING FORM

Date: 1-11-89

Site Name: Border Chemical Printing TDD: 02-8901-17

Photolog:

Frame/Photo Number	Date	Time	Photographer	Description
P7/S7	1/11	0946	D Trube	Back area of property looking ~~west~~ south
P8/S8	1/11	0947	D Trube	Back area of property looking ~~south~~ east

Attach additional sheets if necessary. Provide site name, TDD number, signature, and countersignature on each.

Signature: Diane Trube Date: 1/11/89

Countersignature: Kent Temple Date: 1/12/89

REFERENCE NO. 8

BORDEN INC
180 EAST BROAD STREET, COLUMBUS, OHIO 43215

THOMAS R. HEATON
ENVIRONMENTAL SPECIALIST
ENVIRONMENTAL AFFAIRS

April 6, 1982

USEPA, Region II
Enforcement Division
26 Federal Plaza
New York, New York 10278

Attn: Ms. Jodi Lee Alper, Esq.

Re: Borden Chemical, Printing Ink Division, NJD071462279
Docket No. II RCRA-82-D101-C -CANCELLED

Dear Ms. Alper:

With this letter, Borden Inc. is submitting details of closure activity undertaken at the referenced facility. This submission is pursuant to your March 17, 1982 meeting with Mr. W. B. Barton, Mr. H. A. Rosenzweig, and Mr. F. Rosenbloom of Borden Inc.

If you have any questions, please call the undersigned at (614) 225-4860.

Sincerely,

Thomas R Heaton

Thomas R. Heaton

TRH/slw

cc: George Tyler, Esq.
Asst. Commissioner for Environmental Management
New Jersey Dept. of Environmental Protection

BORDEN CHEMICAL, PRINTING INK DIVISION
Camden, NJ EPA ID #NJD071462279
Closure - Resource Conservation and Recovery Act (RCRA)

I. Facility Conditions

A. General Information

1. Description of plant activity

Principally, the Borden Chemical Printing Ink plant in Camden processed printing ink which was manufactured from oleo-resinate vehicles into which we dispersed colorants by the use of mixing equipment and three-roll mill dispersers. After processing through this equipment, the materials were packed into shipping containers and distributed to customers.

Another type of ink that we manufactured at the Camden location was water base ink (hydrosperse). These inks had a different resin system and a much lower viscosity in the final product. The type of equipment used was high speed mixing equipment plus semi-continuous media mill for dispersion. Once again, the resin system, water and colorant were mixed and then dispersed. After quality control checks, the final ink was packaged and distributed to customers and/or stock. A third type of product made at the Camden plant was dispersed carbon black in water. The type of equipment was similar to water base ink manufacture except the dispersion equipment was large ball mills -- no mixers were involved.

The Printing Ink plant manufactured oil base printing inks and water base dispersions over the past seven years. The plant has been closed and the equipment and raw materials, as well as finished goods, have been transferred to other plant locations.

2. Size of facility

(a) Entire site - 8 1/2 acres

(b) Building space - 125,000 square feet

3. Tanks - storage of product, raw material, fuel oil, and unused tanks left by previous owner of site. No hazardous waste stored in tanks.

(a) Twenty-four (24) storage tanks - 1,000 gallon volume (see table 1 for status of these tanks before cleaning).

Table 1 Storage Tanks

Tank Numbers	Code Number	Status
1 - 4	06L5011	approximately 3 inches oleo-resinate in bottom
5 - 10	NA	empty, not used by Borden
11 - 15	0653210	empty
16 - 19	0653240	empty
20 - 24	0653226	empty

(b) Six (6) processing tanks - 1,000 gallons

(c) One (1) fuel oil tank - 5,000 gallons

(d) One (1) fuel oil tank - 43,000 gallons

4. Waste storage facility - drum storage

(a) Area - 3,750 square feet

(b) Capacity - five hundred (500) 55-gallon drums

5. No other regulated waste storage facilities.

B. Waste Characterization

1. All the process waste is wash material from the formulation of two (2) products -- paste ink and water-based ink. The water-base ink waste was approximately 70% of the total waste volume. The geaeral break-down of these two products are as follows:

(a) Paste ink - 30% resin (varnish material with small residual of phenols)
20% pigment (no more than 20%, usually less)
50% oil (a high boiling point hydrocarbon-flash point 500° F)

(b) Water-base ink -30% clay (filler)
20% pigment (no more than 20% usually less)
50% water

2. The hazardous constituents of both the clean-up wastes are the metals which would be present in the pigment portion of the clean-up. The range of these constituents in the final clean-up waste are as follows. (The high end of the range is the concentration in the ink product - unlikely in the waste.)

(a)	Paste ink waste:	lead	0-320,000 ppm
		copper	0-2,700 ppm
		hexavalent chromium	0-80,000 ppm
		cyanide	0-136,000 ppm
(b)	Water-base ink waste:	barium	0 - 5 ppm
		copper	0 - 2 ppm
		hexavalent chromium	0 - 3 ppm
		cyanide	0 - 1 ppm
		lead	0 - 4 ppm

3. Physical state of the waste

   (a) Paste ink waste - oily, with approximately 3% solids

   (b) Water-base ink waste - 90-96% water, $<$1% solids

4. Specific gravity of the waste

   (a) Paste ink waste - 1.0 - 1.2

   (b) Water-base ink waste - 1.0 - 1.1

5. Flash point of the waste

   (a) Paste ink waste - $>$ 400° F

   (b) Water-base ink waste - no flash point

6. pH of the waste

   (a) Paste ink waste - 7.0

   (b) Water-base ink waste - 6.5 - 8.2

7. The manifests designate two types of waste transported frbm the site.

   (a) K086 - water-base ink waste

   (b) D999 - This is an incorrect designation of the paste ink (solvent) waste. This can also be characterized as K086.

Closure - Resource Conservation and Recovery Act (RCRA) - Camden, NJ

C. Maximum amount of waste inventory ever on-site in any stage of processing - 500 drums.

D. Inventory of auxiliary equipment

1. One (1) boiler

2. Five (5) exhaust fans

3. Ventilators (quantity unknown)

4. One (1) dust collector

E. Schedule of closure

1. Date final process wastes generated - May 1, 1981

2. Date of completion of process waste inventory disposal to off-site facility - May 31, 1981. (no preprocessing required on-site)

3. Date of facility decontamination - May 31, 1982

4. Date of final closure - May 31, 1982

5. Total time required to close the facility - one year, one month

6. Closure activity extends beyond six (6) months because the original closure notification/plan was deemed insufficient by USEPA, Region II.

II. Removing all inventory

A. Maximum amount of waste on-site in any stage of processing - 500 drums.

1. Total amount of waste residue in drums - 750 drums (including clean-up materials)

2. Total number of tanks - 32

(a) Tanks stored no waste, but contained product/raw material residue (oleo-resinate and Petroleum oils) to be cleaned.

(b) Tank cleaning generated approximately 500 gallons of rinsate to be treated and disposed of by CECOS, International, or other approved facility.

(c) Tank cleaning performed by Action Maintenance, Inc.

Closure - Resource Conservation and Recovery Act (RCRA) - Camden, NJ

3. Rinse procedure for tanks

   (a) Rinse with #2 fuel oil

   (b) Rinse with organic solvent

   (c) Clean with high pressure steam to assure no residue

   (d) Air dry

4. No other form of waste storage, on-site, i.e., waste piles, basins, drainage pits, surface impoundments, etc.

B. Pretreatment - no pretreatment of wastes

C. Methods and procedures for treating, disposing, or removing waste inventory

1. Procedures for on-site inventory treatment or disposal - not applicable

2. Procedures for off-site removal of inventory

   (a) Quantity - 734 drums

   (b) To TSD facility - Atlantic Coast Environmental, Inc.
   EPA ID# DED000796300 - Dover, Delaware

   (c) Waste treated - sawdust solidification (T04)
   Landfill disposal - Browning-Ferris Industries Chemical Services, Inc.
   Glen Burnie, Maryland

   Chemical Waste Management, Inc., Emelle, Alabama

III. Decontaminating the facility

A. No soil contamination

B. No contamination of any permanent structure on-site

C. All equipment and/or facilities requiring cleaning

1. Description of each piece of equipment (see Table 2)

2. Procedures for cleaning each piece of equipment (see Table 2)

3. Destination of each piece of equipment (see Table 2)

4. Cleaning carried out by Borden Chemical personnel.

Closure - Resource Conservation and Recovery Act (RCRA) - Camden, NJ

IV. Closure Certification - once closure is complete Borden Inc. will contract an independent professional engineer to certify that the site is properly closed.

Table 2

EQUIPMENT INVENTORY

Number of Units	Equipment Description	Cleaning Method	Distination - Borden Chemical location
9	100 lb. ink tubs	cleaned & rinsed with kerosenic oil	Fair Lawn, N.J.
4	500 lb. ink tubs	cleaned & rinsed with kerosenic oil	Fair Lawn, NJ
4	1000 lb. ink tubs	cleaned & rinsed with kerosenic oil	Fair Lawn, NJ
1	13"x32" three-roll mill	scraped, then rinsed with kerosenic oil; dried	Fair Lawn, NJ
25,000 lbs.	steel balls (water-based product)	rinsed with water	Woodlawn, OH
1	10' diameter tank stainless steel	clean-surplus equipment	Woodlawn, OH
1	laboratory three-roll mill	scraped, then rinsed with kerosenic oil	Odenton, MD
1	10 horsepower (HP) high speed mixer	rinsed and cleaned with kerosenic oil; dried	Odenton, MD
4	400 lb. ink tubs	cleaned and rinsed with kerosenic oil	Odenton, MD
500 lbs.	steel balls (water-based product)	rinsed with water	Fremont, CA
1	filter	rinsed with organic solvent; dried	Fremont, CA
4	ink tubs 4'diameter 4' high	cleaned and rinsed with kerosenic oil	Lakeland, FL
2	2000 gal. stainless steel tank	clean-surplus equip-ment	Woodlawn, OH
2	100 gal. stainless steel tank	clean - surplus equipment	Woodlawn, OH
1	2000 gal. ball mill (water-based product)	outside jacket was scraped; rinsed with water, inside and out	Woodlawn, OH

Table 2
Equipment Inventory (Continued)

2	100 gal. tanks	clean-surplus equipment	Woodlawn, OH
1	50 HP mixer	cleaned with organic solvent; wiped clean	Woodlawn, OH
1	8' diameter ball mill-9' long (water-based product)	rinsed with water	Woodlawn, OH
1	low speed mixer	scraped, then cleaned with kerosenic oil	Woodlawn, OH
1	viking pump	kerosenic oil circulated through	Woodlawn, OH
1	laboratory three-roll mill	cleaned with kerosenic oil	Woodlawn, OH
2	10,000 gal. stainless steel storage tank	clean-surplus equipment	Woodlawn, OH
1	1,000 gal. stainless steel storage tank	clean-surplus equipment	Woodlawn, OH
1	media mill (water-based product)	water circulated through; body of machine scraped clean	Fair Lawn, NJ
6	4' diameter tubs (water-based product)	rinsed with water	Fair Lawn, NJ
1	8" media mill (water-based product)	water circulated through; body of machine scraped clean	Fair Lawn, NJ
1	40 HP mixer (water-based product)	rinsed with water	Odenton, MD
1	Day Pony mixer	scraped and cleaned with kerosenic oil and dried	Sold for scrap
1	Day three-roll mixer	scraped, cleaned with kerosenic oil and dried	Denver, CO
1	three-roll mixer 16" x 40"	scraped, cleaned with kerosenic oil and dried	Lakeland, FL
6	ink tubs, various sizes	scraped, rinsed with kerosenic oil	Denver, CO
1	60-gal. skinner mixer	cleaned and rinsed with kerosenic oil; dried	Fair Lawn, NJ
1	10" media mill (water-based product)	circulated with water, rinsed and drained	Fair Lawn, NJ

Table 2
Equipment Inventory (Continued)

4	filter pump system	cleaned with kerosenic oil, rinsed and dried	Odenton, MD
1	filter pump system	cleaned with kerosenic oil, rinsed and dried	St. Louis, MO
2	three-roll mills	scraped, rinsed with kerosenic oil and drained	Odenton, MD
2	Cowles mixer (water-based product)	rinsed with water and drained	Odenton, MD
6	500 lb. ink tubs	cleaned with kerosenic oil, rinsed and dried	Odenton, MD
20	Ink tubs, various sizes	cleaned with kerosenic oil, rinsed and dried	St. Charles, IL
6	Ink tubs, various	cleaned with kerosenic oil, rinsed and dried	Atlanta, GA

REFERENCE NO. 9

FISH AND WILDLIFE SERVICE LIST OF ENDANGERED AND THREATENED WILDLIFE AND PLANTS

(50 CFR 17.11, 17.12; As shown in Code of Federal Regulations, Volume 50, Revised as of October 1, 1983; 48 FR 46057, October 11, 1983; 48 FR 46331, 46336, 46337, 46341, October 12, 1983; 48 FR 49248, October 25, 1983; 48 FR 52742, 52746, November 22, 1983; 49 FR 1058, January 9, 1984; 49 FR 1994, January 17, 1984; 49 FR 2783, 2786, January 23, 1984; 49 FR 6102, February 17, 1984; 49 FR 7334, February 28, 1984; 49 FR 7394, 7397, February 29, 1984; 49 FR 10525, March 20, 1984; 49 FR 14356, April 11, 1984; 49 FR 21058, May 18, 1984; 49 FR 22329, 22334, May 29, 1984; 49 FR 27514, July 5, 1984; 49 FR 28565, July 13, 1984; 49 FR 29234, 29237, July 19, 1984; 49 FR 30201, July 27, 1984; 49 FR 31420, August 7, 1984; 49 FR 33885, 33892, August 27, 1984; 49 FR 34494, 34500, 34504, 34510, August 31, 1984; 49 FR 35954, September 13, 1984; 49 FR 40038, October 12, 1984; 49 FR 43069, October 26, 1984; 49 FR 43968, November 1, 1984; 49 FR 44756, November 9, 1984; 49 FR 45163, November 15, 1984; 49 FR 47400, December 4, 1984; 50 FR 1056, January 9, 1985)

Title 50—Wildlife and Fisheries

CHAPTER I—UNITED STATES FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR

SUBCHAPTER B—TAKING, POSSESSION, TRANSPORTATION, SALE, PURCHASE, BARTER, EXPORTATION, AND IMPORTATION OF WILDLIFE

PART 17—ENDANGERED AND THREATENED WILDLIFE AND PLANTS

Authority: Pub. L. 93-205, 87 Stat. 884; Pub. L. 94-359, 90 Stat. 911; Pub. L. 95-632, 92 Stat. 3751; Pub. L. 96-159, 93 Stat. 1225; Pub. L. 97-304, 96 Stat. 1411 (16 U.S.C. 1531 *et seq.*)

[Amended by 49 FR 21058, May 18, 1984; 49 FR 22329, 22334, May 29, 1984; 49 FR 27514, July 5, 1984; 49 FR 28565, July 13, 1984; 49 FR 29234, 29237, July 19, 1984; 49 FR 30201, July 27, 1984; 49 FR 31420, August 7, 1984; 49 FR 33885, 33892, August 27, 1984; 49 FR 34494, 34500, 34504, 34510, August 31, 1984; 49 FR 35954, September 13, 1984; 49 FR 43968, November 1, 1984; 49 FR 44756, November 9, 1984; 49 FR 45163, November 15, 1984; 49 FR 47400, December 4, 1984; 50 FR 1056, January 9, 1985]

Subpart B — Lists

§17.11 Endangered and threatened wildlife.

(a) The list in this section contains the names of all species of wildlife which have been determined by the Services to be Endangered or Threatened. It also contains the names of species of wildlife treated as Endangered or Threatened because they are sufficiently similar in appearance to Endangered or Threatened species (see §17.50 et seq.).

(b) The columns entitled "Common Name," "Scientific Name," and "Vertebrate Population Where Endangered or Threatened" define the species of wildlife within the meaning of the Act. Thus, differently classified geographic populations of the same vertebrate subspecies or species shall be identified by their differing geographic boundaries, even though the other two columns are identical. The term "Entire" means that all populations throughout the present range of a vertebrate species are listed. Although common names are included, they cannot be relied upon for identification of any specimen, since they may vary greatly in local usage. The Services shall use the most recently accepted scientific name. In cases in which confusion might arise, a synonym(s) will be provided in parentheses. The Services shall rely to the extent practicable on the *International Code of Zoological Nomenclature.*

(c) In the "Status" column the following symbols are used: "E" for Endangered, "T" for Threatened, and "E [or T] (S/A)" for similarity of appearance species.

(d) The other data in the list are nonregulatory in nature and are provided for the information of the reader. In the annual revision and compilation of this Title, the following information may be amended without public notice: the spelling of species' names, historical range, footnotes, references to certain other applicable portions of this Title, synonyms, and more current names. In any of these revised entries, neither the species, as defined in paragraph (b) of this section, nor its status may be changed without following the procedures of Part 424 of this Title.

(e) The "Historic Range" indicates the known general distribution of the species or subspecies as reported in the current scientific literature. The present distribution may be greatly reduced from this historic range. This column does not imply any limitation on the application of the prohibitions in the Act or implementing rules. Such prohibitions apply to all individuals of the species, wherever found.

(f)(1) A footnote to the Federal Register publication(s) listing or reclassifying a species is indicated under the column "When Listed." Footnote numbers to §§17.11 and 17.12 are in the same numerical sequence, since plants and animals may be listed in the same Federal Register document. That document, at least since 1973, includes a statement indicating the basis for the listing, as well as the effective date(s) of said listing.

(2) The "Special Rules" and "Critical Habitat" columns provide a cross reference to other sections in Parts 17, 222, 226, or 227. The "Special Rules" column will also be used to cite the special rules that describe experimental populations and determine if they are essential or nonessential. Separate listing will be made for experimental populations, and the status column will include the following symbols: "XE" for an essential experimental population and "XN" for a nonessential experimental population. The term "NA" (not applicable) appearing in either of these two columns indicates that there are no special rules and/or Critical Habitat for that particular species. However, all other appropriate rules in Parts 17, 217-227, and 402 still apply to that species. In addition, there may be other rules in this Title that relate to such wildlife, e.g., port-of-entry requirements. It is not intended that the references in the "Special Rules" column

list all the regulations of the two Services which might apply to the species or to the regulations of other Federal agencies or State or local governments.

[17.11(f)(2) amended by 49 FR 33892, August 27, 1984]

(g) The listing of a particular taxon includes, all lower taxonomic units. For example, the genus *Hylobates* (gibbons) is listed as Endangered throughout its entire range (China, India, and SE Asia); consequently, all species, subspecies, and populations of that genus are considered listed as Endangered for the purposes of the Act. In 1978 (43 FR 6230-6233) the species *Haliaeetus leucocephalus* (bald eagle) was listed as Threatened in "USA (WA, OR, MN, WI, MI)" rather than its entire population: thus, all individuals of the bald eagle found in those five States are considered listed as Threatened for the purposes of the Act.

(h) The "List of Endangered and Threatened Wildlife" is provided below:

Species: Common name	Species: Scientific name	Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
MAMMALS							
Anoa, lowland	*Bubalus depressicornis* (= *B. anoa depressicornis*).	Indonesia	Entire	E	3	NA	NA
Anoa, mountain	*Bubalus quarlesi* (= *B. anoa quarlesi*)	do	do	E	15	NA	NA
Antelope, giant sable	*Hippotragus niger variani*	Angola	do	E	15	NA	NA
Argali	*Ovis ammon hodgsoni*	China (Tibet, Himalaya)	do	E	15	NA	NA
Armadillo, giant	*Priodontes maximus* (= *giganteus*)	Venezuela and Guyana to Argentina	do	E	15	NA	NA
Armadillo, pink fairy	*Chlamyphorus truncatus*	Argentina	do	E	3	NA	NA
Ass, African wild	*Equus asinus* (= *africanus*)	Somalia, Sudan, Ethiopia	do	E	3	NA	NA
Ass, Asian wild (= kulan, onager)	*Equus hemionus*	Southwestern and Central Asia	do	E	3	NA	NA
Avahi	*Avahi* (= *Lichanotus*) *laniger* (= entire genus).	Malagasy Republic (= Madagascar)	do	E	3	NA	NA
Aye-Aye	*Daubentonia madagascariensis*	Malagasy Republic (= Madagascar)	do	E	3	NA	NA
Babirusa	*Babyrousa babyrussa*	Indonesia	do	E	15	NA	NA
Bandicoot, barred	*Perameles bougainville*	Australia	do	E	4	NA	NA
Bandicoot, desert	*Perameles eremiana*	do	do	E	6	NA	NA
Bandicoot, lesser rabbit	*Macrotis leucura*	do	do	E	4	NA	NA
Bandicoot, pig-footed	*Chaeropus ecaudatus*	do	do	E	4	NA	NA
Bandicoot, rabbit	*Macrotis lagotis*	do	do	E	4	NA	NA
Banteng	*Bos javanicus* (= *banteng*)	Southeast Asia	do	E	3	NA	NA
Bat, Bulmer's fruit (flying fox)	*Aproteles bulmerae*.	Papua New Guinea	Entire	E		NA	NA
Bat, bumblebee	*Craseonycteris thonglongyai*	Thailand	do	E		NA	NA

[Added by 49 FR 2783, January 23, 1984]

Species: Common name	Species: Scientific name	Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Bat, gray	*Myotis grisescens*	Central and Southeastern U.S.A.	do	E	13	NA	NA
Bat, Hawaiian hoary	*Lasiurus cinereus semotus*	U.S.A. (Hawaii)	do	E	2	NA	NA
Bat, Indiana	*Myotis sodalis*	Eastern and Midwestern U.S.A.	do	E	1	17.95(a)	NA
Bat, little Mariana fruit	Pteropus tokudae	Western Pacific Ocean: U.S.A. (Guam)	Entire range	E	152	NA	NA
Bat, Mariana fruit	Pteropus mariannus mariannus	Western Pacific Ocean: U.S.A. (Guam, Rota, Tinian, Saipan, Aguijan)	Guam	E	152	NA	NA

[Added by 49 FR 33885, August 27 1984]

Species: Common name	Species: Scientific name	Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Bat, Ozark big-eared	*Plecotus townsendii ingens*	U.S.A. (MO, OK, AR)	do	E	85	NA	NA
Bat, Rodrigues fruit (flying fox)	*Pteropus rodricensis*.	Rodrigues Island, Indian Ocean.	do	E		NA	NA
Bat, Singapore roundleaf horseshoe	*Hipposideros ridleyi*	Malaysia	do	E		NA	NA

[Added by 49 FR 2783, January 23, 1984]

Species: Common name	Species: Scientific name	Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Bat, Virginia big-eared	*Plecotus townsendii virginianus*	U.S.A. (KY, WV, VA)	do	E	85	17.95(a)	NA
Bear, brown	*Ursus arctos pruinosus*	China (Tibet)	do	E	15	NA	NA
Bear, brown	*Ursus arctos arctos*	Palearctic	Italy	E	15	NA	NA
Bear, brown or grizzly	*Ursus arctos horribilis*	Canada, Western U.S.A.	U.S.A.—48 conterminous States.	T	1, 2, 9	NA	17.40(b)
Bear, Mexican grizzly	*Ursus arctos nelsoni*	Mexico	Entire	E	3	NA	NA
Beaver	*Castor fiber birulai*	Mongolia	do	E	15	NA	NA
Bison, wood	*Bison bison athabascae*	Canada, Northwestern U.S.A.	Canada	E	3	NA	NA
Bobcat	*Felis rufus escuinapae*	Central Mexico	Entire	E	19	NA	NA
Bontebok (antelope)	*Damaliscus dorcas dorcas*	South Africa	do	E	15	NA	NA
Camel, Bactrian	*Camelus bactrianus* (= *ferus*)	Mongolia, China	do	E	15	NA	NA
Caribou, woodland	*Rangifer tarandus caribou*	Canada, U.S.A. (AK, ID, ME, MI, MN, MT, NH, VT, WA, WI).	Canada (part of S.E. Brit. Col. bounded by the Can.-USA border, Columbia R., Kootenay R., Kootenay L., and Kootenay R.), U.S.A. (ID, WA).	E	128	NA	NA

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
Caribou, woodland	*Rangifer tarandus caribou*	Canada, U.S.A. (AK, ID, ME, MI, MN, MT, NH, VT, WA, WI)	Canada (that part of southeastern British Columbia bounded by the Canada-U.S.A. border, Columbia River, Kootenay River, Kootenay Lake, and Kootenay River), U.S.A. (ID, WA).			NA	NA
[Added by 48 FR 49248, October 25, 1983]							
Caribou, woodland	*Rangifer tarandus caribou*	Canada, U.S.A. (AK, ID, ME, MI, MN, MT, NH, VT, WA, WI).	Canada (that part of southeastern British Columbia bounded by the Canada-U.S.A. border, Columbia River, Kootenay River, Kootenay Lake and Kootenay River), U.S.A. (ID, WA).	E	143	NA	NA
[Added by 49 FR 7394, February 29, 1984]							
Cat, Andean	*Felis jacobita*	Chile, Peru, Bolivia, Argentina	Entire	E	15	NA	NA
Cat, black-footed	*Felis nigripes*	Southern Africa	do	E	15	NA	NA
Cat, flat-headed	*Felis planiceps*	Malaysia, Indonesia	do	E	15	NA	NA
Cat, iriomote	*Felis (Mayailurus) iriomotensis*	Japan (Iriomote Island, Ryukyu Islands)	do	E	50	NA	NA
Cat, leopard	*Felis bengalensis bengalensis*	India, Southeast Asia	do	E	15	NA	NA
Cat, marbled	*Felis marmorata*	Nepal, Southeast Asia, Indonesia	do	E	15	NA	NA
Cat, Pallasian sand	*Felis margarita scheffeli*	Pakistan	do	E		NA	NA
[Added by 49 FR 2783, January 23, 1984]							
Cat, Temminck's (=golden cat)	*Felis temminckii*	NEPal, China, Southeast Asia, Indonesia (Sumatra)	do	E	15	NA	NA
Cat, tiger	*Felis tigrina*	Costa Rica to southern Argentina	do	E	5	NA	NA
Chamois, Apennine	*Rupicapra rupicapra ornata*	Italy	do	E	15	NA	NA
Cheetah	*Acinonyx jubatus*	Africa to India	do	E	3, 5	NA	NA
Chimpanzee	*Pan troglodytes*	West and Central Africa	do	T	16	NA	17.40(c)
Chimpanzee, pygmy	*Pan paniscus*	Zaire	do	T	16	NA	17.40(c)
Chinchilla	*Chinchilla brevicaudata boliviana*	Bolivia	do	E	15	NA	NA
Civet, Malabar large-spotted	*Viverra megaspila civettina*	India	do	E	15	NA	NA
Cochito (=Gulf of California harbor porpoise)	*Phocoena sinus*	Mexico (Gulf of California)	Entire	E	16	NA	NA
[Added by 50 FR 1056, January 9, 1985]							
Colobus, Preuss's red	*Colobus badius preussi*	Cameroon	do	E		NA	NA
[Added by 49 FR 2783, January 23, 1984]							
Cougar, eastern	*Felis concolor couguar*	Eastern North America	do	E	6	NA	NA
Deer, Bactrian	*Cervus elaphus bactrianus*	U.S.S.R., Afghanistan	do	E	50	NA	NA
Deer, Bawean	Axis (=Cervus) porcinus kuhli	Indonesia	do	E	3	NA	NA
[Corrected by 48 FR 34961, August 2, 1983]							
Deer, Barbary	*Cervus elaphus barbarus*	Morocco, Tunisia, Algeria	do	E	50	NA	NA
Deer, Cedros Island mule	*Odocoileus hemionus cedrosensis*	Mexico (Cedros Island)	do	E	10	NA	NA
Deer, Columbian white-tailed	*Odocoileus virginianus leucurus*	U.S.A. (WA, OR)	do	E	1	NA	NA
Deer, Corsican red	*Cervus elaphus corsicanus*	Corsica, Sardinia	do	E	50	NA	NA
Deer, Eld's brow-antlered	*Cervus eldi*	India to Southeast Asia	do	E	3	NA	NA
Deer, Formosan sika	*Cervus nippon taiouanus*	Taiwan	do	E	50	NA	NA
Deer, hog	*Axis (=Cervus) porcinus annamiticus*	Thailand, Indochina	do	E	15	NA	NA
Deer, key	*Odocoileus virginianus clavium*	U.S.A. (southern Florida)	do	E	1	NA	NA
Deer, marsh	*Blastocerus dichotomus*	Argentina, Uruguay, Paraguay, Bolivia, Brazil	do	E	3	NA	NA
Deer, McNeill's	*Cervus elaphus macneilli*	China (Sinkiang, Tibet)	do	E	3	NA	NA
Deer, musk	*Moschus* spp. (all species)	Central and East Asia	Afghanistan, Bhutan, Burma, China (Tibet, Yunnan), India, Nepal, Pakistan, Sikkim.	E	15	NA	NA
Deer, North China sika	*Cervus nippon mandarinus*	China (Shensing and Chili Provinces)	Entire	E	50	NA	NA
Deer, pampas	*Ozotoceros bezoarticus*	Brazil, Argentina, Uruguay, Bolivia, Paraguay.	do	E	15	NA	NA
Deer, Persian fallow	*Dama dama mesopotamica*	Iraq, Iran	do	E	3	NA	NA
Deer, Philippine	*Axis (=Cervus) porcinus calamianensis*	Philippines (Calamian Islands)	do	E	15	NA	NA
Deer, Ryukyu sika	*Cervus nippon keramae*	Japan (Ryukyu Islands)	do	E	50	NA	NA
Deer, Shansi sika	*Cervus nippon grassianus*	China (Shansi Province)	do	E	50	NA	NA
Deer, South China sika	*Cervus nippon kopschi*	Southern China	do	E	50	NA	NA
Deer, swamp (=barasingha)	*Cervus duvaucelii*	India, Nepal	do	E	3	NA	NA
Deer, Taiwan	*Cervus elaphus yarkandensis*	China (Sinkiang)	do	E	50	NA	NA
Dog, African wild	*Lycaon pictus*	Sub-Saharan Africa	do	E		NA	NA
[Added by 49 FR 2783, January 23, 1984]							

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
Dhole (=Asiatic wild dog)	*Cuon alpinus*	U.S.S.R., Korea, China, India, Southeast Asia.	do	E	3	NA	NA
Dhokhar	*Antechinus apicalis*	Australia	do	E	4	NA	NA
Dhil	*Pteropus leucopterus*	Equatorial West Africa	do	E	16	NA	NA
Dugong	*Dugong dugon*	East Africa to southern Japan, including U.S.A. (Trust Territories).	do	E	4	NA	NA
Duiker, Jentink's	*Cephalophus jentinki*	Sierra Leone, Liberia, Ivory Coast	do	E	50	NA	NA
Eland, Western giant	*Taurotragus derbianus derbianus*	Senegal to Ivory Coast	do	E	50	NA	NA
Elephant, African	*Loxodonta africana*	Africa	do	T	40	NA	17.40(c)
Elephant, Asian	*Elephas maximus*	South-central and Southeast Asia	do	E	15	NA	NA
Ferret, black-footed	*Mustela nigripes*	Western U.S.A., Western Canada	do	E	1, 3	NA	NA
Fox, Northern swift	*Vulpes velox hebes*	U.S.A. (northern plains), Canada	Canada	E	3	NA	NA
Fox, San Joaquin kit	*Vulpes macrotis mutica*	U.S.A. (California)	Entire	E	1	NA	NA
Fox, Simien	*Canis (Simenia) simensis*	Ethiopia	do	E	50	NA	NA
Gazelle, Clark's (=Dibatag)	*Ammodorcas clarkei*	Somalia, Ethiopia	do	E	3	NA	NA
Gazelle, Cuvier's	*Gazella cuvieri*	Morocco, Algeria, Tunisia	do	E	3	NA	NA
Gazelle, Mhorr	*Gazella dama mhorr*	Morocco	do	E	3	NA	NA
Gazelle, Moroccan (=Dorcas)	*Gazella dorcas massasylae*	Morocco, Algeria, Tunisia	do	E	3	NA	NA
Gazelle, Rio de Oro Dama	*Gazella dama lozanoi*	Western Sahara	do	E	3	NA	NA
Gazelle, Arabian	*Gazella gazella*	Arabian Peninsula, Palestine, Sinai	do	E	50	NA	NA
Gazelle, sand	*Gazella subgutturosa marica*	Jordan, Arabian Peninsula	do	E	50	NA	NA
Gazelle, Saudi Arabian	*Gazella dorcas saudiya*	Israel, West Jordan, Syria, Arabian Peninsula.	do	E	50	NA	NA
Gazelle, Pelzeln's	*Gazella dorcas pelzelni*	Somalia	do	E	50	NA	NA
Gazelle, slender-horned (=Rhim)	*Gazella leptoceros*	Sudan, Egypt, Algeria, Libya	do	E	3	NA	NA
Gelada (baboon)	*Theropithecus gelada*	Northern Ethiopia	do	T	15	NA	17.40(c)
Gibbons	*Hylobates* spp. (including *Nomascus*)	China, India, Southeast Asia	do	E	3, 15	NA	NA
Goat, wild (=Chilian markhor)	*Capra aegagrus* (=*falconeri chiltanensis*)	South Waziristan Agency	Chiltan Range of west-central Pakistan.	E	15	NA	NA
Gorai	*Nemorhaedus goral*	East Asia	Entire	E	15	NA	NA
Gorilla	*Gorilla gorilla*	Central and Western Africa	do	E	3	NA	NA
Hare, hispid	*Caprolagus hispidus*	India, Nepal, Bhutan	do	E	15	NA	NA
Hartebeest, Swayne's	*Alcelaphus buselaphus swayne*	Ethiopia, Somalia	do	E	3, 50	NA	NA
Hartebeest, Tora	*Alcelaphus buselaphus tora*	Ethiopia, Sudan, Egypt	do	E	50	NA	NA
Hog, pygmy	*Sus salvanius*	India, Nepal, Bhutan, Sikkim	do	E	3	NA	NA
Horse, Przewalski's	*Equus przewalskii*	Mongolia, China	do	E	15	NA	NA
Huemul, North Andean	*Hippocamelus antisensis*	Ecuador, Peru, Chile, Bolivia, Argentina	do	E	15	NA	NA
Huemul, South Andean	*Hippocamelus bisulcus*	Chile, Argentina	do	E	15	NA	NA
Hyena, Barbary	*Hyaena hyaena barbara*	Morocco, Algeria, Tunisia	do	E	3	NA	NA
Hyena, brown	*Hyaena brunnea*	Southern Africa	do	E	3	NA	NA
Ibex, Pyrenean	*Capra pyrenaica pyrenaica*	Spain	do	E	3	NA	NA
Ibex, Walia	*Capra walie*	Ethiopia	do	E	3	NA	NA
Impala, black-faced	*Aepyceros melampus petersi*	Namibia, Angola	do	E	3	NA	NA
Indri	*Indri indri* (=entire genus)	Malagasy Republic (=Madagascar)	do	E	3	NA	NA
Jaguar	*Panthera onca*	U.S.A. (TX, NM, AZ), Central and South America.	Mexico southward	E	5	NA	NA
Jaguarundi	*Felis yagouaroundi cacomitli*	U.S.A. (Texas), Mexico	Entire	E	15	NA	NA
Jaguarundi	*Felis yagouaroundi fossata*	Mexico, Nicaragua	do	E	15	NA	NA
Jaguarundi	*Felis yagouaroundi panamensis*	Nicaragua, Costa Rica, Panama	do	E	15	NA	NA
Jaguarundi	*Felis yagouaroundi tolteca*	U.S.A. (Arizona), Mexico	do	E	15	NA	NA
Kangaroo, eastern gray	*Macropus giganteus* (all subspecies except *tasmaniensis*).	Australia	do	T	7	NA	17.40(g)
Kangaroo, red	*Macropus* (*Megaleia*) *rufus*	do	do	T	7	NA	17.40(g)
Kangaroo, Tasmanian forester	*Macropus giganteus tasmaniensis*	Australia (Tasmania)	do	E	8	NA	NA
Kangaroo, western gray	*Macropus fuliginosus*	Australia	do	T	7	NA	17.40(g)
Kouprey	*Bos sauveli*	Vietnam, Laos, Cambodia, Thailand	do	E	3	NA	NA
Langur, capped	*Presbytis pileata*	India, Burma, Bangladesh	do	E	15	NA	NA
Langur, entellus	*Presbytis entellus*	China (Tibet), India, Pakistan, Kashmir, Sri Lanka, Sikkim, Bangladesh.	do	E	15	NA	NA
Langur, Douc	*Pygathrix nemaeus*	Cambodia, Laos, Vietnam	do	E	3	NA	NA
Langur, Francois	*Presbytis francoisi*	China (Kwangsi), Indochina	do	E	18	NA	NA
Langur, golden	*Presbytis geei*	India (Assam), Bhutan	do	E	15	NA	NA
Langur, long-tailed	*Presbytis potenziani*	Indonesia	do	T	15	NA	17.40(c)
Langur, Pagi Island	*Nasalis* (*Simias*) *concolor*	do	do	E	3	NA	NA
Langur, purple-faced	*Presbytis senex*	Sri Lanka (=Ceylon)	do	T	18	NA	17.40(c)
Langur, Tonkin snub-nosed	*Pygathrix* (*Rhinopithecus*) *avunculus*	Vietnam	do	T	18	NA	17.40(c)
Leaf-eater, red	*Kobus leche*	Southern Africa	do	T	3, 15, 106	NA	NA
Lemurs	*Lemuridae* (incl. *Charogaleidae*, *Lepilemuridae*); all members of genera *Lemur*, *Phaner*, *Hapalemur*, *Lepilemur*, *Microcebus*, *Allocebus*, *Charogaleus*, *Varecia*.	Malagasy Republic (=Madagascar)	do	E	3, 15	NA	NA
Leopard	*Panthera pardus*	Africa, Asia	Wherever found except where it is listed as Threatened as set forth below.	E	3, 5, 114	NA	NA
Leopard	*Panthera pardus*	Africa, Asia	In Africa, in the wild, south of a line running along the borders of the following countries: Gabon/Rio Muni; Gabon/Cameroon;	T	3, 5, 114	NA	17.40(i)

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
Leopard, clouded	*Neofelis nebulosa*	Southeast and south-central Asia, Taiwan	Entire	E	3, 15	NA	NA
Leopard, snow	*Panthera uncia*	Central Asia	do	E	5	NA	NA
Linsang, spotted	*Prionodon pardicolor*	Nepal, Assam, Vietnam, Cambodia, Laos, Burma.	do	E	15	NA	NA
Lion, Asiatic	*Panthera leo persica*	Turkey to India	do	E	3	NA	NA
Loris, lesser slow	*Nycticebus pygmaeus*	Indochina	do	T	15	NA	17.40(c)
Lynx, Spanish	*Felis (=Lynx) pardina*	Spain, Portugal	do	E	3	NA	NA
Macaque, Formosan rock	*Macaca cyclopis*	Taiwan	do	T	16	NA	17.40(c)
Macaque, Japanese	*Macaca fuscata*	Japan (Shikoku, Kyushu and Honshu islands).	do	T	15	NA	17.40(c)
Macaque, lion-tailed	*Macaca silenus*	India	do	E	3	NA	NA
Macaque, stump-tailed	*Macaca arctoides*	India (Assam) to southern China	do	T	16	NA	17.40(c)
Macaque, Toque	*Macaca sinica*	Sri Lanka (=Ceylon)	do	T	16	NA	17.40(c)
Manatee, Amazonian	*Trichechus inunguis*	South America (Amazon River Basin).	do	E	3	NA	NA
Manatee, West African	*Trichechus senegalensis*	West Coast of Africa from Senegal River to Cuanza River.	do	T	52	NA	NA
Manatee, West Indian (Florida)	*Trichechus manatus*	U.S.A. (Louisiana, Florida), Caribbean Sea, South America.	do	E	1, 3	17.95(f)	NA
Mara	*Pipa pipra*	Equatorial West Africa	do	E	16	NA	NA
Mangabey, Tana River	*Cercocebus galeritus*	Kenya	do	E	3	NA	NA
mangabey, white-collared	*Cercocebus torquatus*	Senegal to Ghana; Nigeria to Gabon	do	E	16	NA	NA
Margay	*Felis wiedi*	U.S.A. (Texas), Central and South America	Mexico southward	E	5	NA	NA
Markhor, Kabul	*Capra falconeri megaceros*	Afghanistan, Pakistan	Entire	E	15	NA	NA
Markhor, straight-horned	*Capra falconeri jerdoni*	do	do	E	15	NA	NA
Marmoset, buff-headed.	*Callithrix flaviceps*	Brazil	do	E		NA	NA

[Added by 49 FR 2783, January 23, 1984]

Marmoset, cotton-top	*Saguinus oedipus*	Costa Rica to Colombia	do	E	16	NA	NA
Marmoset, Goeldi's	*Callimico goeldii*	Brazil, Colombia, Ecuador, Peru, Bolivia	do	E	3	NA	NA
Marmot, Vancouver Island.	*Marmota vancouverensis.*	Canada (Vancouver Island).	do	E		NA	NA

[Added by 49 FR 2783, January 23, 1984]

Marsupial, eastern jerboa	*Antechinomys laniger*	Australia	do	E	4	NA	NA
Marsupial-mouse, large desert	*Sminthopsis psammophila*	do	do	E	4	NA	NA
Marsupial-mouse, long-tailed	*Sminthopsis longicaudata*	do	do	E	4	NA	NA
Marten, Formosan yellow-throated	*Martes flavigula chrysospila*	Taiwan	do	E	3	NA	NA
Monkey, black colobus	*Colobus satanas*	Equatorial Guinea, People's Republic of Congo, Cameroon, Gabon.	do	E	16	NA	NA
Monkey, black howler	*Alouatta pigra*	Mexico, Guatemala, Belize	do	E	16	NA	17.40(c)
Monkey, Diana	*Cercopithecus diana*	Coastal West Africa	do	E	16	NA	NA
Monkey, howler	*Alouatta palliata (=villosa)*	Mexico to South America	do	E	15	NA	NA
Monkey, L'Hoest's	*Cercopithecus lhoesti*	Upper Eastern Congo Basin, Cameroon	do	E	16	NA	NA
Monkey, proboscis	*Nasalis larvatus*	Borneo	do	E	15	NA	NA
Monkey, red-backed squirrel	*Saimiri sciureus*	Costa Rica, Panama	do	E	3	NA	NA
Monkey, red-bellied	*Cercopithecus erythrogaster*	Western Nigeria	do	E	16	NA	NA
Monkey, red-eared nose-spotted	*Cercopithecus erythrotis*	Nigeria, Cameroon, Fernando Po	do	E	16	NA	NA
Monkey, spider	*Ateles geoffroyi frontatus*	Costa Rica, Nicaragua	do	E	3	NA	NA
Monkey, spider	*Ateles geoffroyi panamensis*	Costa Rica, Panama	do	E	3	NA	NA
Monkey, Tana River red colobus	*Colobus rufomitratus (=badius) rufomitratus.*	Kenya	do	E	3, 16	NA	NA
Monkey, woolly spider	*Brachyteles arachnoides*	Brazil	do	E	3	NA	NA
Monkey, yellow-tailed woolly	*Lagothrix flavicauda*	Andes of northern Peru	do	E	16	NA	NA
Monkey, Zanzibar red colobus	*Colobus kirki*	Tanzania	do	E	3	NA	NA
Mouse, Australian native	*Zyzomys (=Notomys) pedunculatus*	Australia	do	E	15	NA	NA
Mouse, Australian native	*Notomys aquilo*	do	do	E	15	NA	NA
Mouse, Field's	*Pseudomys fieldi*	do	do	E	4	NA	NA
Mouse, Gould's	*Pseudomys gouldi*	do	do	E	6	NA	NA
Mouse, Key Largo cotton	*Peromyscus gossypinus allapaticola*	U.S.A. (Florida)	Entire	E		N/A	N/A

[Added by 48 FR 43043, September 21, 1983]

Mouse, Key Largo cotton	*Peromyscus gossypinus allapaticola*	U.S.A. (Fla.)	Entire	E	[illegible]	[illegible]	[illegible]

[Added by 49 FR 34510, August 31, 1984]

Mouse, New Holland	*Pseudomys novaehollandiae*	do	do	E	4	NA	NA
Mouse, salt marsh harvest	*Reithrodontomys raviventris*	U.S.A. (California)	do	E	2	NA	NA
Mouse, Shark Bay	*Pseudomys praeconis*	Australia	do	E	4	NA	NA
Mouse, Shortridge's	*Pseudomys shortridgei*	do	do	E	4	NA	NA
Mouse, Smoky	*Pseudomys fumeus*	do	do	E	4	NA	NA
Mouse, western	*Pseudomys occidentalis*	do	do	E	4	NA	NA
Muntjac, Fea's	*Muntiacus feae*	Northern Thailand, Burma	do	E	50	NA	NA
Native-cat, eastern	*Dasyurus viverrinus*	Australia	do	E	6	NA	NA
Numbat	*Myrmecobius fasciatus*	do	do	E	6	NA	NA
Ocelot	*Felis pardalis*	U.S.A. (TX, AZ) south through Central America to South America.	do	E	4, 6	NA	NA
				E	5, 11(i)	NA	NA

[Sec. 17.11(h)]

Species: Common name	Species: Scientific name	Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Orangutan	*Pongo pygmaeus*	Borneo, Sumatra	do	E	3	NA	NA
Oryx, Arabian	*Oryx leucoryx*	Arabian Peninsula	do	E	3	NA	NA
Otter, Cameroon clawless	*Aonyx (=Paraonyx) congica microdon*	Cameroon, Nigeria	do	E	3	NA	NA
Otter, giant	*Pteronura brasiliensis*	South America	do	E	3	NA	NA
Otter, long-tailed (=La Plata)	*Lutra longicaudis (incl. platensis)*	do	do	E	3, 15	NA	NA
Otter, marine	*Lutra felina*	Peru south to Straits of Magellan	do	E	15	NA	NA
Otter, southern river	*Lutra provocax*	Chile, Argentina	do	E	15	NA	NA
Otter, southern sea	*Enhydra lutris nereis*	West coast U.S.A. (WA, OR, CA) south to Mexico (Baja California)	do	T	21	NA	NA
Panda, giant	*Ailuropoda melanoleuca*	People's Republic of China.	do	E		NA	NA
[Added by 49 FR 2783, January 23, 1984]							
Pangolin (=scaly anteater)	*Manis temminckii*	Africa	do	E	15	NA	NA
Panther, Florida	*Felis concolor coryi*	U.S.A. (LA and AR east to SC and FL)	do	E	1	NA	NA
Planigale, little	*Planigale ingrami subtilissima* (formerly *P. subtilissima*)	Australia	do	E	4	NA	NA
Planigale, southern	*Planigale tenuirostris*	do	do	E	4	NA	NA
Porcupine, thin-spined	*Chaetomys subspinosus*	Brazil	do	E	3	NA	NA
Possum, mountain pygmy	*Burramys parvus*	Australia	do	E	4	NA	NA
Possum, scaly-tailed	*Wyulda squamicaudata*	do	do	E	4	NA	NA
Prairie dog, Mexican	*Cynomys mexicanus*	Mexico	do	E	3	NA	NA
Prairie dog, Utah	*Cynomys parvidens*	U.S.A. (UT)	Entire	T	6, 14	NA	17.40(g)
		[Amended by 49 FR 22334, May 29, 1984]					
Pronghorn, peninsular	*Antilocapra americana peninsularis*	Mexico (Baja California)	do	E	11	NA	NA
Pronghorn, Sonoran	*Antilocapra americana sonoriensis*	U.S.A. (AZ), Mexico	do	E	1, 3	NA	NA
Pudu	*Pudu pudu*	Southern South America	do	E	15	NA	NA
Puma, Costa Rican	*Felis concolor costaricensis*	Nicaragua, Panama, Costa Rica	do	E	15	NA	NA
Quokka	*Setonix brachyurus*	Australia	do	E	8	NA	NA
Rabbit, Ryukyu	*Pentalagus furnessi*	Japan (Ryukyu Islands)	do	E	50	NA	NA
Rabbit, volcano	*Romerolagus diazi*	Mexico	do	E	3	NA	NA
Rat, false water	*Xeromys myoides*	Australia	do	E	4	NA	NA
Rat, stick-nest	*Leporillus conditor*	do	do	E	6	NA	NA
Rat, Morro Bay kangaroo	*Dipodomys heermanni morroensis*	U.S.A. (California)	do	E	2	17.95(a)	NA
Rat—kangaroo, brush-tailed	*Bettongia penicillata*	Australia	do	E	4	NA	NA
Rat—kangaroo, Gaimard's	*Bettongia gaimardi*	do	do	E	6	NA	NA
Rat—kangaroo, Lesueur's	*Bettongia lesueur*	do	do	E	4	NA	NA
Rat—kangaroo, plain	*Caloprymnus campestris*	do	do	E	4	NA	NA
Rat—kangaroo, Queensland	*Bettongia tropica*	do	do	E	4	NA	NA
Rhinoceros, black	*Diceros bicornis*	Sub-Saharan Africa	do	E	97	NA	NA
Rhinoceros, great Indian	*Rhinoceros unicornis*	India, Nepal	do	E	4	NA	NA
Rhinoceros, Javan	*Rhinoceros sondaicus*	Indonesia, Indochina, Burma, Thailand, Sikkim, Bangladesh, Malaysia.	do	E	3	NA	NA
Rhinoceros, northern white	*Ceratotherium simum cottoni*	Zaire, Sudan, Uganda, Central African Republic.	do	E	3	NA	NA
Rhinoceros, Sumatran	*Dicerorhinus (=Didermocerus) sumatrensis.*	Bangladesh to Vietnam to Indonesia (Borneo).	do	E	3	NA	NA
Saiga, Mongolian (antelope)	*Saiga tatarica mongolica.*	Mongolia	do	E	15	NA	NA
Saki, white-nosed	*Chiropotes albinasus*	Brazil	do	E	3	NA	NA
Seal, Caribbean monk	*Monachus tropicalis*	Caribbean Sea, Gulf of Mexico	do	E	1, 3, 45	NA	NA
Seal, Hawaiian monk	*Monachus schauinslandi*	Hawaiian Archipelago	do	E	14	NA	NA
Seal, Mediterranean monk	*Monachus monachus*	Mediterranean, Northwest African Coast and Black Sea.	do	E	3	NA	NA
Seladang (=Gaur)	*Bos gaurus*	Bangladesh, Southeast Asia, India	do	E	3	NA	NA
Serow, Sumatran	*Capricornis sumatraensis*	Sumatra	do	E	15	NA	NA
Serval, Barbary	*Felis serval constantina*	Algeria	do	E	3	NA	NA
Shapo	*Ovis vignei vignei*	Kashmir	do	E	15	NA	NA
Shou	*Cervus elaphus wallichi*	Tibet, Bhutan	do	E	3	NA	NA
Siamang	*Symphalangus syndactylus*	Malaysia, Indonesia	do	E	15	NA	NA
Sifakas	*Propithecus spp. (all species)*	Malagasy Republic (=Madagascar)	do	E	4	NA	NA
Sloth, Brazilian three-toed	*Bradypus torquatus*	Brazil	do	E	3, 4	NA	NA
Solenodon, Cuban	*Solenodon (Atopogale) cubanus*	Cuba	do	E	3	NA	NA
Solenodon, Haitian	*Solenodon paradoxus*	Dominican Republic, Haiti	do	E	3	NA	NA
Squirrel, Delmarva Peninsula fox	*Sciurus niger cinereus*	U.S.A. (DelMarVa Peninsula to Southeast PA).	do	E	1	NA	NA
Squirrel, Delmarva Peninsula fox	*Sciurus niger cinereus*	U.S.A. (Delmarva Peninsula to southeast PA).	U.S.A. (DE—Sussex County)	XN	161	NA	17.84(a)
[Added by 49 FR 35954, September 13, 1984]							
Stag, Barbary	*Cervus elaphus barbarus*	Tunisia, Algeria	do	E	3	NA	NA
Stag, Kashmir	*Cervus elaphus hanglu*	Kashmir	do	E	1	NA	NA
Suni, Zanzibar	*Neotragus (Nesotragus) moschatus moschatus.*	Zanzibar (and nearby islands)	do	E	50	NA	NA
Tahr, Arabian	*Hemitragus jayakari*	Oman	do	E	50	NA	NA
Tamaraw	*Bubalus mindorensis*	Philippines	do	E	4	NA	NA
Tamarin, golden-rumped (=golden-headed Tamarin, =golden-lion Marmoset).	*Leontopithecus (=Leontideus) spp. (all species)*	Brazil	do	E	3	NA	NA
Tamarin, pied	*Saguinus bicolor*	Northern Brazil	do	E	16	NA	NA
Tamarin, white-footed	*Saguinus leucopus*	Northern Colombia	do	T	16	NA	17.40(c)
Tapir, Asian	*Tapirus indicus*	Burma, Laos, Cambodia, Vietnam, Malaysia, Indonesia, Thailand.	do	E	15	NA	NA
Tapir, Brazilian	*Tapirus terrestris*	Colombia and Venezuela south to Paraguay and Argentina.	do	E	3	NA	NA
Tapir, Central American	*Tapirus bairdii*	Southern Mexico to Colombia and Ecuador.	do	E	3	NA	NA
Tapir, mountain	*Tapirus pinchaque*	Colombia, Ecuador and possibly Peru and Venezuela.	do	E	3	NA	NA
Tarsier, Philippine	*Tarsius syrichta*	Philippines	do	T	16	NA	17.40(c)
Tiger	*Panthera tigris*	Temperate and Tropical Asia	do	E	3, 5	NA	NA
Tiger, Tasmanian (=Thylacine)	*Thylacinus cynocephalus*	Australia	do	E	3	NA	NA
Uakari (all species)	*Cacajao spp. (all species)*	Peru, Brazil, Ecuador, Columbia, Venezuela.	do	E	3	NA	NA

Species: Common name	Species: Scientific name	Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Urial	*Ovis musimon (= orientalis) ophion*	Cyprus	do	E	15	NA	NA
Vicuna	*Vicugna vicugna*	South America (Andes)	do	E	3	NA	NA
Vole, Amargosa	*Microtus californicus scirpensis*	U.S.A. (CA)	Entire	E	168	17.95(a)	NA

[Added by 49 FR 45163, November 15, 1984]

Species: Common name	Species: Scientific name	Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Wallaby, banded hare	*Lagostrophus fasciatus*	Australia	do	E	4	NA	NA
Wallaby, brindled nail-tailed	*Onychogalea fraenata*	do	do	E	4	NA	NA
Wallaby, crescent nail-tailed	*Onychogalea lunata*	do	do	E	4	NA	NA
Wallaby, Parma	*Macropus parma*	do	do	E	4	NA	NA
Wallaby, Western hare	*Lagorchestes hirsutus*	do	do	E	4	NA	NA
Wallaby, yellow-footed rock	*Petrogale xanthopus*	do	do	E	6	NA	NA
Whale, blue	*Balaenoptera musculus*	Oceanic	do	E	3	NA	NA
Whale, bowhead	*Balaena mysticetus*	Oceanic (north latitudes only)	do	E	3	NA	NA
Whale, finback	*Balaenoptera physalus*	Oceanic	do	E	3	NA	NA
Whale, gray	*Eschrichtius robustus*	North Pacific Ocean: coastal and Bering Sea	do	E	3	NA	NA
Whale, humpback	*Megaptera novaeangliae*	Oceanic	do	E	3	NA	NA
Whale, right	*Balaena glacialis*	do	do	E	3	NA	NA
Whale, Sei	*Balaenoptera borealis*	do	do	E	3	NA	NA
Whale, sperm	*Physeter catodon*	do	do	E	[illegible]	NA	NA
Wolf, gray	*Canis lupus*	Holarctic	U.S.A. (48 conterminous States other than MN), Mexico	E	1, 6, 13, 15, 35	17.95(a)	NA
Wolf, gray	*Canis lupus*	do	U.S.A. (MN)	T	35	17.95(a)	17.40(d)
Wolf, maned	*Chrysocyon brachyurus*	Argentina, Bolivia, Brazil, Paraguay, Uruguay	Entire	E	4	NA	NA
Wolf, red	*Canis rufus*	U.S.A. (southeastern U.S.A. west to central TX)	do	E	1	NA	NA
Wombat, hairy-nosed (= Barnard's and Queensland hairy-nosed)	*Lasiorhinus krefftii* (formerly *L. barnardi* and *L. gillespiei*)	Australia	do	E	4, 8	NA	NA
Woodrat, Key Largo	*Neotoma floridana smalli*	do	do	do		do	do

[Added by 48 FR 43043, September 21, 1983]

Species: Common name	Species: Scientific name	Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Woodrat, Key Largo	*Neotoma floridana smalli*	U.S.A. (FL)	Entire	E	131E, 160	NA	NA

[Added by 49 FR 34510, August 31, 1984]

Species: Common name	Species: Scientific name	Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Yak, wild	*Bos grunniens*	China (Tibet), India	do	E	3	NA	NA
Zebra, Grevy's	*Equus grevyi*	Kenya, Ethiopia, Sudan	do	T	54	NA	NA
Zebra, Hartmann's mountain	*Equus zebra hartmannae*	Namibia, Angola	do	T	54, 111	NA	NA
Zebra, mountain	*Equus zebra zebra*	South Africa	do	E	15, 111	NA	NA
BIRDS							
Akepa, Hawaii (honeycreeper)	*Loxops coccineus coccineus*	U.S.A. (Hawaii)	do	E	2	NA	NA
Akepa, Maui (honeycreeper)	*Loxops coccineus ochraceus*	do	do	E	2	NA	NA
Akialoa, Kauai (honeycreeper)	*Hemignathus procerus*	do	do	E	1	NA	NA
Akiapolaau (honeycreeper)	*Hemignathus munroi (= wilsoni)*	do	do	E	1	NA	NA
Albatross, short-tailed	*Diomedea albatrus*	North Pacific Ocean: Japan, U.S.S.R., U.S.A. (AK, CA, HI, OR, WA)	Entire, except U.S.A.	E	3	NA	NA
Blackbird, yellow-shouldered	*Agelaius xanthomus*	U.S.A. (Puerto Rico)	Entire	E	[illegible]	17.95(b)	NA
Broadbill, Guam	*Myiagra freycineti*	Western Pacific Ocean: U.S.A. (Guam)	Entire range	E	[illegible]		NA

[Added by 49 FR 33885, August 27, 1984]

Species: Common name	Species: Scientific name	Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Bobwhite, masked (quail)	*Colinus virginianus ridgwayi*	U.S.A. (Arizona), Mexico (Sonora)	do	E	1, 3	NA	NA
Booby, Abbott's	*Sula abbotti*	Indian Ocean: Christmas Island	do	E	15	NA	NA
Bristlebird, western	*Dasyornis brachypterus longirostris*	Australia	do	E	3	NA	NA
Bristlebird, western rufous	*Dasyornis broadbenti litoralis*	do	do	E	15	NA	NA
Bulbul, Mauritius olivaceous	*Hypsipetes borbonicus olivaceus*	Indian Ocean: Mauritius	do	E	3	NA	NA
Bullfinch, Sao Miguel (finch)	*Pyrrhula pyrrhula murina*	Eastern Atlantic Ocean: Azores	do	E	3	NA	NA
Bushwren, New Zealand	*Xenicus longipes*	New Zealand	do	E	[illegible]	NA	NA
Bustard, great Indian	*Choriotis nigriceps*	India, Pakistan	do	E	3	NA	NA
Cahow (= Bermuda Petrel)	*Pterodroma cahow*	North Atlantic Ocean: Bermuda	do	E	3	NA	NA
Condor, Andean	*Vultur gryphus*	Colombia to Chile and Argentina	do	E	4	NA	NA
Condor, California	*Gymnogyps californianus*	U.S.A. (OR, CA), Mexico (Baja California)	do	E	1	17.95(b)	NA
Coot, Hawaiian (= Alae keokeo)	*Fulica americana alai*	U.S.A. (Hawaii)	do	E	2	NA	NA
Cotinga, banded	*Cotinga maculata*	Brazil	do	E	[illegible]	NA	NA
Cotinga, white-winged	*Xipholena atropurpurea*	do	do	E	[illegible]	NA	NA
Crane, black-necked	*Grus nigricollis*	China (Tibet)	do	E	15	NA	NA
Crane, Cuba sandhill	*Grus canadensis nesiotes*	West Indies: Cuba	do	E	15	NA	NA
Crane, hooded	*Grus monacha*	Japan, U.S.S.R.	do	E	4	NA	NA
Crane, Japanese	*Grus japonensis*	China, Japan, Korea, U.S.S.R.	do	E	3	NA	NA
Crane, Mississippi sandhill	*Grus canadensis pulla*	U.S.A. (Mississippi)	do	E	6	17.95(b)	NA
Crane, Siberian white	*Grus leucogeranus*	U.S.S.R. (Siberia) to India, including Iran and China	do	E	4	NA	NA
Crane, white-naped	*Grus vipio*	Mongolia	do	E	15	NA	NA
Crane, whooping	*Grus americana*	Canada, U.S.A. (Rocky Mountains east to Carolinas), Mexico	do	E	1, 3	17.95(b)	NA
Creeper, Hawaii	*Oreomystis (= Loxops) mana*	U.S.A. (Hawaii)	do	E	10	NA	NA
Creeper, Molokai (= Kakawahie)	*Paroreomyza (= Loxops) flammea*	do	do	E	2	NA	NA
Creeper, Oahu (= alauwahio)	*Paroreomyza (= Loxops) maculata*	do	do	E	2	NA	NA
Crow, Hawaiian (= alala)	*Corvus tropicus*	do	do	E	1	NA	NA
Crow, Mariana	*Corvus kubaryi*	Western Pacific Ocean: U.S.A. (Guam, Rota)	do	E			NA

[Added by 49 FR 33885, August 27, 1984]

[Sec. 17.11(h)]

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
Cuckoo-shrike, Mauritius	*Coracina (=Coracina) typicus*	Indian Ocean: Mauritius	do	E	3	NA	NA
Cuckoo-shrike, Reunion	*Coracina (=Coracina) newtoni*	Indian Ocean: Reunion	do	E	3	NA	NA
Curassow, razor-billed	*Mitu (=Crax) mitu mitu*	Brazil (Eastern)	do	E	15	NA	NA
Curassow, red-billed	*Crax alumenaceni*	Brazil	do	E	4	NA	NA
Curassow, Trinidad white-headed	*Pipile pipile pipile*	West Indies: Trinidad	do	E	3	NA	NA
Curlew, Eskimo	*Numenius borealis*	Alaska and northern Canada to Argentina	do	E	1, 3	NA	NA
Dove, cloven-feathered	*Drepanoptila holosericea*	Southwest Pacific Ocean: New Caledonia	do	E	3	NA	NA
Dove, Grenada	*Leptotila wellsi*	West Indies: Grenada	do	E	3	NA	NA
Dove, Palau ground	*Gallicolumba canifrons*	West Pacific Ocean: U.S.A. (Palau Islands)	do	E	3	NA	NA
Duck, Hawaiian (=koloa)	*Anas wyvilliana*	U.S.A. (Hawaii)	do	E	1	NA	NA
Duck, Laysan	*Anas laysanensis*	do	do	E	1	NA	NA
Duck, pink-headed	*Rhodonessa caryophyllacea*	India	do	E	15	NA	NA
Duck, white-winged wood	*Cairina scutulata*	India, Malaysia, Indonesia, Thailand	do	E	3	NA	NA
Eagle, Greenland white-tailed	*Haliaeetus albicilla groenlandicus*	Greenland and adjacent Arctic islands	do	E	15	NA	NA
Eagle, harpy	*Harpia harpyja*	Mexico south to Argentina	do	E	15	NA	NA
Eagle, Philippine (=monkey-eating)	*Pithecophaga jefferyi*	Philippines	do	E	3	NA	NA
Eagle, bald	*Haliaeetus leucocephalus*	North America south to northern Mexico	U.S.A. (conterminous States, except WA, OR, MN, WI, MI)	E	1, 34	NA	NA
Eagle, bald	*Haliaeetus leucocephalus*	do	U.S.A. (WA, OR, MN, WI, MI).	T	34	NA	17.81(a)
Eagle, Spanish imperial	*Aquila heliaca adalberti*	Spain, Morocco, Algeria	Entire	C	3	NA	NA
Egret, Chinese	*Egretta eulophotes*	China, Korea	do	E	3	NA	NA
Falcon, American peregrine	*Falco peregrinus anatum*	Nests from central Alaska across north-central Canada to central Mexico, western south to South America.	Entire	E	2,3, 146	NA for listed	NA
		[Revised by 49 FR 10525, March 20, 1984]					
Falcon, Arctic peregrine	*Falco peregrinus tundrius*	Nests from northern Alaska to Greenland, winters south to Central and South America.	do	T	2,3, 168	NA	NA
		[Revised by 49 FR 10525, March 20, 1984]					
Falcon, Eurasian peregrine	*Falco peregrinus peregrinus*	Eastern Europe, Eurasia, except in Africa and Asia east.	do	E	15	NA	NA
Falcon, peregrine	*Falco peregrinus*	Worldwide, except Antarctica and most Pacific islands.	Wherever found in wild in the conterminous 48 States.	E(S/A)	145	NA	NA
		[Added by 49 FR 10525, March 20, 1984]					
Finch, Laysan (honeyeeper)	*Telespyza (=Psittirostra) cantans*	U.S.A. (Hawaii)	do	E	1	NA	NA
Finch, Nihoa (honeyeeper)	*Telespyza (=Psittirostra) ultima*	do	do	E	1	NA	NA
Flycatcher, Euler's	*Empidonax euleri johnstonei*	West Indies: Grenada	do	E	3	NA	NA
Flycatcher, Palau fantail	*Rhipidura lepida*	West Pacific Ocean: U.S.A. (Palau Islands).	do	E	3	NA	NA
Flycatcher, Seychelles paradise	*Terpsiphone corvina*	Indian Ocean: Seychelles	do	E	3	NA	NA
Flycatcher, Tahiti	*Pomarea nigra*	South Pacific Ocean: Tahiti	do	E	3	NA	NA
Flycatcher, Tinian monarch	*Monarcha takatsukasae*	Western Pacific Ocean: U.S.A. (Marianas Islands).	do	E	3	NA	NA
Fody, Seychelles (weaver-finch)	*Foudia sechellarum*	Indian Ocean: Seychelles	do	E	3	NA	NA
Frigatebird, Andrew's	*Fregata andrewsi*	East Indian Ocean	do	E	15	NA	NA
Gallinule, Hawaiian (moorhen)	*Gallinula chloropus sandvicensis*	U.S.A. (Hawaii)	do	E	1	NA	NA
Gallinule Mariana	*Gallinula chloropus guami*	Western Pacific Ocean, U.S.A. (Guam, Tinian, Saipan, Pagan)	do	E	156	NA	NA
		[Added by 49 FR 33885, August 27, 1984]					
Goose, Aleutian Canada	*Branta canadensis leucopareia*	Western U.S.A. (AK, CA, OR, WA), Japan	do	E	1, 3	NA	NA
Goose, Hawaiian (=nene)	*Nesochen (=Branta) sandvicensis*	U.S.A. (Hawaii)	do	E	1	NA	NA
Gooshawk, Christmas Island	*Accipiter fasciatus natalis*	Indian Ocean: Christmas Island	do	E	3	NA	NA
Grackle, slender-billed	*Quiscalus (=Cassidix) palustris*	Mexico	do	E	3	NA	NA
Grasswren, Eyrean (flycatcher)	*Amytornis goyderi*	Australia	do	E	3	NA	NA
Grebe, Atitlan	*Podilymbus gigas*	Guatemala	do	E	3	NA	NA
Greenshank, Nordmann's	*Tringa guttifer*	U.S.S.R., Japan, south to Malaya, Borneo	do	E	15	NA	NA
Guan, horned	*Oreophasis derbianus*	Guatemala, Mexico	do	E	3	NA	NA
Gull, Audouin's	*Larus audouini*	Mediterranean Sea	do	E	3	NA	NA
Gull, relict	*Larus relictus*	India, China	do	E	15	NA	NA
Hawk, Anjouan Island sparrow	*Accipiter francesii pusillus*	Indian Ocean: Comoro Islands	do	E	3	NA	NA
Hawk, Galapagos	*Buteo galapagoensis*	Ecuador (Galapagos Islands)	do	E	3	NA	NA
Hawk, Hawaiian (=io)	*Buteo solitarius*	U.S.A. (Hawaii)	do	E	1	NA	NA
Hermit, hook-billed (hummingbird)	*Glaucis (=Ramphodon) dohrnii*	Brazil	do	E	15	NA	NA
Honeycreeper, crested (=akohekohe)	*Palmeria dolei*	U.S.A. (Hawaii)	do	E	1	NA	NA

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
Hornbill, helmeted	*Rhinoplax vigil*	Thailand, Malaysia	do	E	15	NA	NA
Honeyeater, helmeted	*Meliphaga cassidix*	Australia	do	E	4	NA	NA
Ibis, Japanese crested	*Nipponia nippon*	China, Japan, U.S.S.R., Korea	do	E	3	NA	NA
Kagu	*Rhynochetos jubatus*	Southwestern Pacific Ocean: New Caledonia.	do	E	3	NA	NA
Kakapo (=owl-parrot)	*Strigops habroptilus*	New Zealand	do	E	3	NA	NA
Kestrel, Mauritius	*Falco punctatus*	Indian Ocean: Mauritius	do	E	3	NA	NA
Kestrel, Seychelles	*Falco araea*	Indian Ocean: Seychelles Islands	do	E	3	NA	NA
[illegible] Micronesian	*Halcyon cinnamomina cinnamomina*	Western Pacific Ocean: U.S.A. (Guam).	do	E	15[illegible]	[illegible]	[illegible]

[Added by 49 FR 33885, August 27, 1984]

Kite, Cuba black-billed	*Chondrohierax uncinatus wilsonii*	West Indies: Cuba	do	E	3	NA	NA
Kite, Grenada hook-billed	*Chondrohierax uncinatus mirus*	West Indies: Grenada	do	E	3	NA	NA
Kite, Everglade (snail kite)	*Rostrhamus sociabilis plumbeus*	U.S.A. (Florida)	do	E	1	17.95(b)	NA
Kokako (wattlebird)	*Callaeas cinerea*	New Zealand	do	E	3	NA	NA
Macaw, glaucous	*Anodorhynchus glaucus*	Paraguay, Uruguay, Brazil	do	E	15	NA	NA
Macaw, indigo	*Anodorhynchus leari*	Brazil	do	E	15	NA	NA
Macaw, little blue	*Cyanopsitta spixi*	do	do	E	15	NA	NA
Magpie-robin, Seychelles (thrush)	*Copsychus sechellarum*	Indian Ocean: Seychelles Islands	do	E	3	NA	NA
Malkoha, red-faced (coucal)	*Phaenicophaeus pyrrocephalus*	Sri Lanka (=Ceylon)	do	E	3	NA	NA
Mallard, Mariana	*Anas oustaleti*	West Pacific Ocean: U.S.A. (Guam, Mariana Islands).	do	E	23	NA	NA
Megapode, Le Perouse's	*Megapodius laperouse*	West Pacific Ocean: U.S.A. (Palau Island, Mariana Islands).	do	E	3	NA	NA
Megapode, Maleo	*Macrocephalon maleo*	Indonesia (Celebes)	do	E	3	NA	NA
Millerbird, Nihoa (willow warbler)	*Acrocephalus familiaris kingi*	U.S.A. (Hawaii)	do	E	1	NA	NA
Nukupu'u (honeycreeper)	*Hemignathus lucidus*	do	do	E	1, 2	NA	NA
'O'o, Kauai (='O'o 'A'a) (honeyeater).	*Moho braccatus*	do	do	E	1	NA	NA
Ostrich, Arabian	*Struthio camelus syriacus*	Jordan, Saudi Arabia	do	E	3	NA	NA
Ostrich, West African	*Struthio camelus spatzi*	Spanish Sahara	do	E	3	NA	NA
'O'u (honeycreeper)	*Psittirostra psittacea*	U.S.A. (Hawaii)	do	E	1	NA	NA
Owl, Anjouan scops	*Otus rutilus capnodes*	Indian Ocean: Comoro Island	do	E	3	NA	NA
Owl, giant scops	*Otus gurneyi*	Philippines: Mindoro and Mindanao Island.	do	E	15	NA	NA
Owl, Palau	*Otus podargina*	West Pacific Ocean: U.S.A. (Palau Islands).	do	E	3	NA	NA
Owl, Seychelles	*Otus insularis*	Indian Ocean: Seychelles Islands	do	E	3	NA	NA
Owlet, Mr Morden's	*Otus rensae*	Kenya	do	E	3	NA	NA
Palila (honeycreeper)	*Loxioides (=Psittirostra) bailleui*	U.S.A. (Hawaii)	do	E	1	17.95(b)	NA
Parakeet, Forbes'	*Cyanoramphus auriceps forbesi*	New Zealand	do	E	3, 15	NA	NA
Parakeet, golden	*Aratinga guarouba*	Brazil	do	E	4	NA	NA
Parakeet, golden-shouldered (=hooded).	*Psephotus chrysopterygius*	Australia	do	E	3	NA	NA
Parakeet, Mauritius	*Psittacula echo*	Indian Ocean: Mauritius	do	E	3	NA	NA
Parakeet, ochre-marked	*Pyrrhura cruentata*	Brazil	do	E	3	NA	NA
Parakeet, orange-bellied	*Neophema chrysogaster*	Australia	do	E	4	NA	NA
Parakeet, paradise (=beautiful)	*Psephotus pulcherrimus*	do	do	E	4	NA	NA
Parakeet, scarlet-chested (=splendid)	*Neophema splendida*	do	do	E	4	NA	NA
Parakeet, turquoise	*Neophema pulchella*	do	do	E	3	NA	NA
Parrot, Australian	*Geopsittacus occidentalis*	do	do	E	3	NA	NA
Parrot, Bahaman or Cuban	*Amazona leucocephala*	West Indies: Cuba, Bahamas, Caymans	do	E	3, 15	NA	NA
Parrot, ground	*Pezoporus wallicus*	Australia	do	E	6	NA	NA
Parrot, imperial	*Amazona imperialis*	West Indies: Dominica	do	E	3	NA	NA
Parrot, Puerto Rican	*Amazona vittata*	U.S.A. (Puerto Rico)	do	E	1	NA	NA
Parrot, red-browed	*Amazona rhodocorytha*	Brazil	do	E	3	NA	NA
Parrot, red-capped	*Pionopsitta pileata*	do	do	E	15	NA	NA
Parrot, red-necked	*Amazona arausiaca*	West Indies: Dominica	do	E	50	NA	NA
Parrot, red-spectacled	*Amazona pretrei pretrei*	Brazil, Argentina	do	E	15	NA	NA
Parrot, St. Lucia	*Amazona versicolor*	West Indies: St. Lucia	do	E	3	NA	NA
Parrot, St. Vincent	*Amazona guildingii*	West Indies: St. Vincent	do	E	3	NA	NA
Parrot, thick-billed	*Rhynchopsitta pachyrhyncha*	Mexico, U.S.A. (AZ, NM)	Mexico	E	3	NA	NA
Parrot, vinaceous-breasted	*Amazona vinacea*	Brazil	Entire	E	15	NA	NA
Parrotbill, Maui (honeycreeper)	*Pseudonestor xanthophrys*	U.S.A. (Hawaii)	do	E	1	NA	NA
Pelican, brown	*Pelecanus occidentalis*	U.S.A. (Carolinas to Texas, CA), West Indies, Central and South America: Coastal.	do	E	2, 3	NA	NA
Penguin, Galapagos	*Spheniscus mendiculus*	Ecuador (Galapagos Island)	do	E	3	NA	NA
Petrel, Hawaiian dark-rumped	*Pterodroma phaeopygia sandwichensis*	U.S.A. (Hawaii)	do	E	2, 4, 1	NA	NA
Pheasant, bar-tailed	*Syrmaticus humiae*	Burma, China	do	E	3	NA	NA
Pheasant, Blyth's tragopan	*Tragopan blythii*	Burma, China, India	do	E	3	NA	NA
Pheasant, brown eared	*Crossoptilon mantchuricum*	China	do	E	3	NA	NA
Pheasant, Cabot's tragopan	*Tragopan caboti*	do	do	E	3	NA	NA
Pheasant, Chinese monal	*Lophophorus lhuysii*	do	do	E	3	NA	NA
Pheasant, Edward's	*Lophura edwardsi*	Vietnam	do	E	3	NA	NA
Pheasant, Elliot's	*Syrmaticus elliotii*	China	do	E	15	NA	NA
Pheasant, imperial	*Lophura imperialis*	Vietnam	do	E	3	NA	NA
Pheasant, Mikado	*Syrmaticus mikado*	Taiwan	do	E	3	NA	NA
Pheasant, Palawan peacock	*Polyplectron emphanum*	Philippines	do	E	3	NA	NA
Pheasant, Sclater's monal	*Lophophorus sclateri*	Burma, China, India	do	E	3	NA	NA
Pheasant, Swinhoe's	*Lophura swinhoii*	Taiwan	do	E	3	NA	NA
Pheasant, western tragopan	*Tragopan melanocephalus*	India, Pakistan	do	E	3	NA	NA
Pheasant, white eared	*Crossoptilon crossoptilon*	China (Tibet), India	do	E	4	NA	NA
Pigeon, Azores wood	*Columba palumbus azorica*	East Atlantic Ocean, Azores	do	E	3	NA	NA
Pigeon, Chatham Island	*Hemiphaga novaeseelandiae chathamensis.*	New Zealand	do	E	3	NA	NA
Pigeon, Mindoro zone-tailed	*Ducula mindorensis*	Philippines	do	E	15	NA	NA
Pigeon, Puerto Rican plain	*Columba inornata wetmorei*	U.S.A. (Puerto Rico)	do	E	2	NA	NA

[See. 17.11(h)]

Species: Common name	Species: Scientific name	Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Piping-guan, black-fronted	*Pipile jacutinga*	Argentina	do	E	15	NA	NA
Pitta, Koch's	*Pitta kochi*	Philippines	do	E	15	NA	NA
Plover, New Zealand shore	*Thinornis novaeseelandiae*	New Zealand	do	E	3	NA	NA
Po'o-uli (honeycreeper)	*Melamprosops phaeosoma*	U.S.A. (Hawaii)	do	E	10	NA	NA
Prairie-chicken, Attwater's greater	*Tympanuchus cupido attwateri*	U.S.A. (Texas)	do	E	1	NA	NA
Quail, Merriam's Montezuma	*Cyrtonyx montezumae merriami*	Mexico (Vera Cruz)	do	E	15	NA	NA
Quetzal, resplendent	*Pharomachrus mocinno*	Mexico to Panama	do	E	15	NA	NA
Rail, Auckland Island	*Rallus pectoralis muelleri*	New Zealand	do	[illegible]	[illegible]		NA
Rail, California clapper	*Rallus longirostris obsoletus*	U.S.A. (California)	do	[illegible]			[illegible]
Rail, Guam	*Rallus owstoni*	Western Pacific Ocean: U.S.A. (Guam)	do		[illegible]	[illegible]	

[Added by 49 FR 14356, April 11, 1984]

Species: Common name	Species: Scientific name	Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Rail, Guam	[illegible] owstoni	Western Pacific Ocean: U.S.A. (Guam)	do		148, 156	[illegible]	

[Added by 49 FR 33885, August 27, 1984]

Species: Common name	Species: Scientific name	Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Rail, light-footed clapper	*Rallus longirostris levipes*	U.S.A. (California), Mexico (Baja California)	do			NA	NA
Rail, Lord Howe wood	*Tricholimnas sylvestris*	Australia (Lord Howe Island)	do	E	15	NA	NA
Rail, Yuma clapper	*Rallus longirostris yumanensis*	Mexico, U.S.A. (AZ, CA)	do	E	1	NA	NA
Rhea, Darwin's	*Pterocnemia pennata*	Argentina, Bolivia, Peru, Uruguay	do	E	3	NA	NA
Robin, Chatham Island	*Petroica traversi*	New Zealand	do	E	3	NA	NA
Robin, scarlet-breasted (flycatcher)	*Petroica multicolor multicolor*	Australia (Norfolk Island)	do	E	3	NA	NA
Rockfowl, grey-necked	*Picathartes oreas*	Cameroon	do	E	3	NA	NA
Rockfowl, white-necked	*Picathartes gymnocephalus*	Africa: Togo to Sierra Leone	do	E	3	NA	NA
Roller, long-tailed ground	*Uratelornis chimaera*	Malagasy Republic (=Madagascar)	do	E	3	NA	NA
Scrub-bird, noisy	*Atrichornis clamosus*	Australia	do	E	3	NA	NA
Shama, Cebu black (thrush)	*Copsychus niger cebuensis*	Philippines	do	E	3	NA	NA
Shearwater, Newell's (Townsend's, formerly Manx) (= A'o)	*Puffinus auricularis* (formerly *puffinus*) *newelli*	U.S.A. (Hawaii)	do	T	10	NA	NA
Shrike, San Clemente loggerhead	*Lanius ludovicianus mearnsi*	U.S.A. (California)	do	E	25	NA	NA
Siskin, red	*Carduelis* (= *Spinus*) *cucullatus*	South America	do	E	15	NA	NA
Sparrow, Cape Sable seaside	*Ammospiza maritima mirabilis*	U.S.A. (Florida)	do	E	1	17.95(b)	NA
Sparrow, dusky seaside	*Ammospiza maritima nigrescens*	do	do	E	1	17.95(b)	NA
Sparrow, San Clemente sage	*Amphispiza belli clementeae*	U.S.A. (California)	do	T	25	NA	NA
Sparrow, Santa Barbara song	(Removed by 48 FR 46337, October 12, 1983)						
Starling, Ponape mountain	*Aplonis pelzelni*	West Pacific Ocean: U.S.A. (Caroline Islands)	do	E	3	NA	NA
Starling, Rothschild's (myna)	*Leucopsar rothschildi*	Indonesia (Bali)	do	E	3	NA	NA
Stilt, Hawaiian (= Ae'o)	*Himantopus himantopus knudseni*	U.S.A. (Hawaii)	do	E	2	NA	NA
Stork, oriental white	*Ciconia ciconia boyciana*	China, Japan, Korea, U.S.S.R.	do	E	1	NA	NA
Stork, wood	*Mycteria americana*	U.S.A. (CA, AZ, TX to Carolinas), Mexico, Central and South America	U.S.A. (AL, FL, GA, SC)	[illegible]	[illegible]	NA	NA

[Added by 49 FR 7334 February 28, 1984]

Species: Common name	Species: Scientific name	Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Swiftlet, Vanikoro	*Aerodramus* (= *Collocalia*) *vanikorensis bartschi*	Western Pacific Ocean: U.S.A. (Guam, Rota, Tinian, Saipan, Agiguan)	do	[illegible]		[illegible]	[illegible]

[Added by 49 FR 33885, August 27, 1984]

Species: Common name	Species: Scientific name	Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Teal, Campbell Island flightless	*Anas aucklandica nesiotis*	New Zealand (Campbell Island)	do	E	[illegible]	NA	NA
Tern, California least	*Sterna antillarum* (= *albifrons*) *browni*	Mexico, U.S.A. (CA)	do	E	2, 3	NA	NA
Thrasher, white-breasted	*Ramphocinclus brachyurus*	West Indies: St. Lucia, Martinique	do	E	3	NA	NA
Thrush, large Kauai	*Phaeornis obscurus myadestina*	U.S.A. (Hawaii)	do	E	2	NA	NA
Thrush, Molokai (= oloma'o)	*Phaeornis obscurus rutha*	do	do	E	2	NA	NA
Thrush, New Zealand (wattlebird)	*Turnagra capensis*	New Zealand	do	E	3	NA	NA
Thrush, small Kauai (= puaiohi)	*Phaeornis palmeri*	U.S.A. (Hawaii)	do	E	1	NA	NA
Tinamou, solitary	*Tinamus solitarius*	Brazil, Paraguay, Argentina	do	E	15	NA	NA
Trembler, Martinique brown (thrasher)	*Cinclocerthia ruficauda gutturalis*	West Indies: Martinique	do	E	3	NA	NA
Wanderer, plain (collared-hemipode)	*Pedionomus torquatus*	Australia	do	E	6	NA	NA
Warbler (wood), Bachman's	*Vermivora bachmanii*	U.S.A. (Southeastern), Cuba	do	E	1, 3	NA	NA
Warbler (wood), Barbados yellow	*Dendroica petechia petechia*	West Indies: Barbados	do	E	3	NA	NA
Warbler (wood), Kirtland's	*Dendroica kirtlandii*	U.S.A. (principally MI), Canada, West Indies: Bahama Islands	do	E	1, 3	NA	NA
Warbler (willow), reed	*Acrocephalus luscinia*	Western Pacific Ocean: U.S.A. (Mariana Islands)	do	E	3	NA	NA
Warbler (willow), Rodrigues	*Bebrornis rodericanus*	Mauritius (Rodrigues Islands)	do	E	3	NA	NA
Warbler (wood), Semper's	*Leucopeza semperi*	West Indies: St. Lucia	do	E	3	NA	NA
Warbler (willow), Seychelles	*Bebrornis sechellensis*	Indian Ocean: Seychelles Island	do	E	3	NA	NA
Whipbird, Western	*Psophodes nigrogularis*	Australia	do	E	3	NA	NA
Whip-poor-will, Puerto Rican	*Caprimulgus noctitherus*	U.S.A. (Puerto Rico)	do	E	4	NA	NA
White-eye, bridled	*Zosterops conspicillata conspicillata*	Western Pacific Ocean: U.S.A. (Guam)	do	E	156	NA	NA

[Added by 49 FR 33885, August 27, 1984]

Species: Common name	Species: Scientific name	Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
White-eye, Norfolk Island	*Zosterops albogularis*	Indian Ocean: Norfolk Islands	do	E	15	NA	NA
White-eye, Ponape great	*Rukia longirostra* (= *sanfordi*)	West Pacific Ocean: U.S.A. (Caroline Islands)	do	E	3	NA	NA
White-eye, Seychelles	*Zosterops modesta*	Indian Ocean: Seychelles	do	E	3	NA	NA
Woodpecker, imperial	*Campephilus imperialis*	Mexico	do	E	3	NA	NA
Woodpecker, ivory-billed	*Campephilus principalis*	U.S.A. (southcentral and southeastern), Cuba	do	E	1, 3	NA	NA
Woodpecker, red-cockaded	*Picoides* (= *Dendrocopos*) *borealis*	U.S.A. (southcentral and southeastern)	do	E	2	NA	NA
Woodpecker, Tristram's	*Dryocopus javensis richardsi*	Korea	do	E	3	NA	NA
Wren, Guadeloupe house	*Troglodytes aedon guadeloupensis*	West Indies: Guadeloupe	do	E	3	NA	NA
Wren, St. Lucia house	*Troglodytes aedon mesoleucus*	West Indies: St. Lucia	do	E	3	NA	NA

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
Reptiles							
Alligator, American	Alligator mississippiensis	Southeastern U.S.A.	Wherever found in wild except those areas where listed as threatened as set forth below	E	1, 11, 51, 6c, 111	NA	NA
do	do	do	U.S.A. (FL and certain areas of GA, SC)	T	20.47, 90.111	NA	17.42(a)
do	do	do	U.S.A. (LA, TX)	T(S/A)	47, 51	NA	17.42(a)
do	do	do	In cassaity wherever found	T(S/A)	50, 111, 47, 51, 111	NA	17.42(a)

(Amended by 48 FR 49396, October 12, 1983)

Alligator, Chinese	*Alligator sinensis*	China	Entire	E			NA
Anole, Culebra Island giant	*Anolis roosevelti*	U.S.A. (Puerto Rico: Culebra Island)	do	E	25	17.95(c)	NA
Boa, Jamaican	*Epicrates subflavus*	Jamaica	do	E	3	NA	NA
Boa, Mona	*Epicrates monensis monensis*	U.S.A. (Puerto Rico)	do	T	33	17.95(c)	NA
Boa, Puerto Rican	*Epicrates inornatus*	do	do	E	2	NA	NA
Boa, Round Island (no common name)	*Casarea dussumieri*	Indian Ocean: Mauritius	do	E	98	NA	NA
Boa, Round Island (no common name)	*Bolyeria multocarinata*	Indian Ocean: Mauritius	do	E	98	NA	NA
Boa, Virgin Islands tree	*Epicrates monensis grenti*	U.S. and British Virgin Islands	do	E	2, 98	NA	NA
Caiman, Apaporis River	*Caiman crocodilus apaporiensis*	Colombia	do	E	15	NA	NA
Caiman, black	*Melanosuchus niger*	Amazon basin	do	E	15	NA	NA
Caiman, broad-snouted	*Caiman latirostris*	Brazil, Argentina, Paraguay, Uruguay	do	E	15	NA	NA
Caiman, Yacare	*Caiman crocodilus yacare*	Eastern Argentina, Paraguay, Brazil	do	E	3	NA	NA
Chuckwalla, San Esteban Island	*Sauromalus varius*	Mexico	do	E	86	NA	NA
Crocodile, African dwarf	*Osteolaemus tetraspis tetraspis*	West Africa	do	E	19	NA	NA
Crocodile, African West Nile-related	*Crocodylus cataphractus*	Western and coastal Africa	do	E	5	NA	NA
Crocodile, American	*Crocodylus acutus*	U.S.A. (FL), Mexico, South America, Central America, Caribbean	do	E	10, 87	17.95(c)	NA
Crocodile, Ceylon mugger	*Crocodylus palustris kimbula*	Sri Lanka	do	E	15	NA	NA
Crocodile, Congo dwarf	*Osteolaemus tetraspis osborni*	Congo River drainage	do	E	15	NA	NA
Crocodile, Cuban	*Crocodylus rhombifer*	Cuba	do	E	3	NA	NA
Crocodile, Morelet's	*Crocodylus moreletii*	Mexico, Belize, Guatemala	do	E	1	NA	NA
Crocodile, mugger	*Crocodylus palustris palustris*	India, Pakistan, Iran, Sri Lanka	do	E	15	NA	NA
Crocodile, Nile	*Crocodylus niloticus*	Africa	do	E	3	NA	NA
Crocodile, Orinoco	*Crocodylus intermedius*	South America: Orinoco River Basin	do	E	3	NA	NA
Crocodile, Philippine	*Crocodylus mindorensis (=novaeguineae)*	Philippine islands	do	E	15	NA	NA
Crocodile, saltwater (=estuarine)	*Crocodylus porosus*	Southeast Asia, Australia, Papua New Guinea, Pacific islands	Entire, except Papua New Guinea	E	97	NA	NA
Crocodile, Siamese	*Crocodylus siamensis*	Southeast Asia, Malay Peninsula	Entire	E	15	NA	NA
Gavial (=gharial)	*Gavialis gangeticus*	Pakistan, Burma, Bangladesh, India	do	E	3, 15	NA	NA
Gecko, Day	*Phelsuma edwardnewtoni*	Indian Ocean: Mauritius	do	E	3	NA	NA
Gecko, Monito	*Sphaerodactylus micropithecus*	U.S.A. (Puerto Rico)	do	E	125	17.95(c)	NA
Gecko, Round Island day	*Phelsuma guentheri*	Indian Ocean: Mauritius	do	E	3	NA	NA
Gecko, Serrano Island	*Cnemidophorus serranus*	do	do	T	129	NA	NA
Iguana, Abaco	*Cyclura cychlura abaconis*	West Indies: Bahamas	do	E	129	NA	NA
Iguana, Allen's Cay	*Cyclura cychlura allenii*	do	do	T	129	NA	NA
Iguana, Andros Island ground	*Cyclura cychlura cychlura*	do	do	T	129	NA	NA
Iguana, Anegada ground	*Cyclura pinguis*	West Indies: British Virgin Islands (Anegada Island)	do	E	3	NA	NA
Iguana, Barrington land	*Conolophus pallidus*	Ecuador (Galapagos Island)	do	E	3	NA	NA
Iguana, Cayman Brac ground	*Cyclura nubila lewisi*	West Indies: Cayman Islands	do	T	129	NA	NA
Iguana, Cuban ground	*Cyclura nubila nubila*	Cuba	Entire (excluding population introduced in Puerto Rico)	T	129	NA	NA
Iguana, Cumie Island	*Cyclura cychlura figginsi*	West Indies: Bahamas	Entire	T	129	NA	NA
Iguana, Fiji banded	*Brachylophus fasciatus*	Pacific: Fiji, Tonga	do	E	86	NA	NA
Iguana, Fiji crested	*Brachylophus vitiensis*	Pacific: Fiji	do	E	86	NA	NA
Iguana, Grand Cayman ground	*Cyclura nubila lewisi*	West Indies: Cayman Islands	do	E	129	NA	NA
Iguana, Jamaican	*Cyclura collei*	West Indies: Jamaica	do	E	129	NA	NA
Iguana, Mayaguana	*Cyclura carinata bartschi*	West Indies: Bahamas	do	T	129	NA	NA
Iguana, Mona ground	*Cyclura stejnegeri*	U.S.A. (Puerto Rico: Mona Island)	do	T	33	17.95(c)	NA
Iguana, Turks and Caicos	*Cyclura carinata carinata*	West Indies: Turks and Caicos Islands	do	T	129	NA	NA
Iguana, Wanning Island ground	*Cyclura nubila nubila*	West Indies: Bahamas	do	E	129	NA	NA
Iguana, White Cay ground	*Cyclura nubila croxleyi*	do	do	T	129	NA	NA
Lizard, blunt-nosed leopard	*Gambelia (=Crotaphytus) silus*	U.S.A. (California)	do	E	1	NA	NA
Lizard, Coachella Valley fringe-toed	*Uma inornata*	do	do	T	105	17.95(c)	NA
Lizard, Hierro giant	*Gallotia simonyi simonyi*	Spain (Canary Islands)	Entire	E	142	NA	NA

[Added by 49 FR 7397, February 29, 1984]

Lizard, Ibiza wall	*Podarcis pityusensis*	Spain (Balearic Islands)	Entire	T	142	NA	NA

[Added by 49 FR 7397, February 29, 1984]

[Sec. 17.11(h)]

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
Lizard, Island night	*Xantusia (= Klauberina) riversiana*	do	do	T	98	NA	NA
Lizard, St. Croix ground	*Ameiva polops*	U.S.A. (Virgin Islands: Green Cay, Protestant Cay).	do	E	24	17.95(c)	NA
Monitor, Bengal	*Varanus bengalensis*	Iran, Iraq, India, Sri Lanka, Malaysia, Afghanistan, Burma, Vietnam, Thailand.	do	E	15	NA	NA
Monitor, desert	*Varanus griseus*	North Africa to Neareast, Caspian Sea through U.S.S.R. to Pakistan, Northwest India.	do	E	15	NA	NA
Monitor, Komodo island	*Varanus komodoensis*	Indonesia (Komodo, Rintja, Padar, and western Flores Island).	do	E	15	NA	NA
Monitor, yellow	*Varanus flavescens*	West Pakistan through India to Bangladesh.	do	E	15	NA	NA
Python, Indian	*Python molurus molurus*	Sri Lanka and India	do	E	15	NA	NA
Rattlesnake, Aruba island	*Crotalus unicolor*	Aruba Island (Netherland Antilles)	do	T	129	NA	NA
Rattlesnake, New Mexican ridge-nosed.	*Crotalus willardi obscurus*	U.S.A. (NM), Mexico	do	T	43	17.95(c)	NA
Skink, Round Island	*Leiolopisma telfairi*	Indian Ocean: Mauritius	do	T	129	NA	NA
Snake, Atlantic salt marsh	*Nerodia fasciata taeniata*	U.S.A. (Florida)	do	T	30	NA	NA
Snake, eastern indigo	*Drymarchon corais couperi*	U.S.A. (AL, FL, GA, MS, SC)	do	T	32	NA	NA
Snake, San Francisco garter	*Thamnophis sirtalis tetrataenia*	U.S.A. (California)	do	E	1	NA	NA
Tartaruga	*Podocnemis expansa*	South America: Orinoco and Amazon River basins.	do	E	3	NA	NA
Terrapin, river (= Turtong)	*Batagur baska*	Malaysia, Bangladesh, Burma, India, Indonesia.	do	E	3	NA	NA
Tomistoma	*Tomistoma schlegelii*	Malaysia, Indonesia	do	E	15	NA	NA
Tortoise, angulated	*Geochelone yniphora*	Malagasy Republic (= Madagascar)	do	E	15	NA	NA
Tortoise, Bolson	*Gopherus flavomarginatus*	Mexico	do	E	48	NA	NA
Tortoise, desert	*Scaptochelys (= Gopherus) agassizi*	U.S.A. (UT, AZ, CA, NV); Mexico	Beaver Dam Slope, Utah.	T	103	17.95(c)	NA
Tortoise, Galapagos	*Geochelone elephantopus*	Ecuador (Galapagos Islands)	Entire	E	3	NA	NA
Tortoise, Indian hog-shell	*Lissemys punctata punctata*	India, Pakistan, Bangladesh	do	E	15	NA	NA
Tortoise, radiated	*Geochelone (= Testudo) radiata*	Malagasy Republic (= Madagascar)	do	E	3	NA	NA
Tracaja	*Podocnemis unifilis*	South America: Orinoco and Amazon River basins.	do	E	3	NA	NA
Tuatara	*Sphenodon punctatus*	New Zealand	do	E	3	NA	NA
Turtle, aquatic box	*Terrapene coahuila*	Mexico	do	E	6	NA	NA
Turtle, black softshell	*Trionyx nigricans*	Bangladesh	do	E	15	NA	NA
Turtle, Burmese peacock	*Morenia ocellata*	Burma	do	E	15	NA	NA
Turtle, Central American river	*Dermatemys mawii*	Mexico, Belize, Guatemala	do	E	129	NA	NA
Turtle, Cuatro Cienegas softshell	*Trionyx ater*	Mexico	do	E	15	NA	NA
Turtle, geometric	*Psammobates geometricus (= Geochelone geometrica).*	South Africa	do	E	15	NA	NA
Turtle, green sea	*Chelonia mydas*	Circumglobal in tropical and temperate seas and oceans.	Wherever found except where listed as endangered below.	T	42	NA	17.42(b) and Parts 220 and 227.
Turtle, green sea	*Chelonia mydas*	do	Breeding colony populations in FL and on Pacific coast of Mexico.	E	42	NA	NA
Turtle, hawksbill sea (= carey)	*Eretmochelys imbricata*	Tropical seas	Entire	E	3	17.95(c)	NA
Turtle, Indian flap-shelled (Removed by 49 FR 7397, February 29, 1984)							
Turtle, Indian sawback	*Kachuga tecta tecta*	India	do	E	15	NA	NA
Turtle, Indian softshell	*Trionyx gangeticus*	Pakistan, India	do	E	15	NA	NA
Turtle, Kemp's (= Atlantic) Ridley sea.	*Lepidochelys kempi*	Tropics and temperate seas	do	E	4	NA	NA
Turtle, leatherback sea	*Dermochelys coriacea*	Tropical, temperate, and subpolar seas	do	E	3	17.95(b)	NA
Turtle, loggerhead sea	*Caretta caretta*	Circumglobal in tropical and temperate seas and oceans.	do	T	42	NA	17.42(b) and Parts 220 and 227.
Turtle, Olive (Pacific) Ridley sea	*Lepidochelys olivacea*	do	Wherever found except where listed as endangered below.	T	42	NA	17.42(b) and Parts 220 and 227.
Turtle, Olive (Pacific) Ridley sea	*Lepidochelys olivacea*	do	Breeding colony populations on Pacific coast of Mexico.	E	42	NA	NA
Turtle, peacock softshell	*Trionyx flavimarginatus*	India, Bangladesh	Entire	E	15	17.95(d)	NA
Turtle, Plymouth red-bellied	*Pseudemys (= Chrysemys) nuttalli hoyi.*	U.S.A. (Massachusetts)	do	E	50	17.95(d)	NA
Turtle, short-necked or western swamp.	*Pseudemydura umbrina*	Australia	do	E	3	NA	NA
Turtle, spotted pond	*Geoclemys (= Geoemyda) hamiltoni*	North India, Pakistan	do	E	16	NA	NA
Turtle, three-keeled Asian	*Melanochelys (= Geoclemys, Geoemyda) trijuga*	Central India to Bangladesh and Burma	do	E	15	NA	NA
	[Corrected by 48 FR 34981, August 2, 1983]						
Viper, Lar Valley	*Vipera latifi*	Iran	do	E	128	NA	NA
AMPHIBIANS							
Coqui, golden	*Eleutherodactylus jasperi*	U.S.A. (Puerto Rico)	do	T	29	17.95(d)	NA
Frog, Israel painted	*Discoglossus nigriventer*	Israel	do	E	3	NA	NA
Frog, Panamanian golden	*Atelopus varius zeteki*	Panama	do	E	15	NA	NA
Frog, Stephen Island	*Leiopelma hamiltoni*	New Zealand	do	E	3	NA	NA
Salamander, Chinese giant	*Andrias davidianus davidianus*	Western China	do	E	15	NA	NA
Salamander, desert slender	*Batrachoseps aridus*	U.S.A. (California)	do	E	6	NA	NA

Species: Common name	Species: Scientific name	Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Salamander, Japanese giant	*Andrias davidianus japonicus*	Japan	do	E	15	NA	NA
Salamander, Red Hills	*Phaeognathus hubrichti*	U.S.A. (Alabama)	do	T	19	NA	NA
Salamander, San Marcos	*Eurycea nana*	U.S.A. (Texas)	do	T	44	17.95(d)	17.43(a)
Salamander, Santa Cruz long-toed	*Ambystoma macrodactylum croceum*	U.S.A. (California)	do	E	1	NA	NA
Salamander, Texas blind	*Typhlomolge rathbuni*	U.S.A. (Texas)	do	E	1	NA	NA
Toad, African viviparous	*Nectophrynoides* spp.	Tanzania, Guinea, Ivory Coast, Cameroon, Liberia, Ethiopia.	do	E	15	NA	NA
Toad, Cameroon	*Bufo superciliaris*	Equatorial Africa	do	E	15	NA	NA
Toad, Houston	*Bufo houstonensis*	U.S.A. (Texas)	do	E	2	17.95(d)	NA
Toad, Monte Verde	*Bufo periglenes*	Costa Rica	do	E	15	NA	NA
Toad, Wyoming	*Bufo hemiophrys baxteri*	U.S.A. (WY)	Entire	E	[illegible]	NA	NA
[Added by 49 FR 1994, January 17, 1984]							
Treefrog, pine barrens	*Hyla andersoni*	U.S.A. (FL, AL, NC, SC, NJ)	do	E	29	17.95(d)	NA
	[Amended by 48 FR 52742, November 22, 1983]						
FISHES							
Ala Balik (trout)	*Salmo platycephalus*	Turkey	Entire	E	3	NA	NA
Ayumodoki (loach)	*Hymenophysa (=Botia) curta*	Japan	do	E	3	NA	NA
Blindcat, Mexican (catfish)	*Prietella phreatophila*	Mexico	do	E	3	NA	NA
Bonytail, Pahranagat	*Gila robusta jordani*	U.S.A. (Nevada)	do	E	8	NA	NA
Bonytongue, Asian	*Scleropages formosus*	Thailand, Indonesia, Malaysia	do	E	15	NA	NA
Catfish (no common name)	*Pangasius sanitwongsei*	Thailand	do	E	3	NA	NA
Catfish, giant	*Pangasianodon gigas*	do	do	E	3	NA	NA
Catfish, Yaqui	*Ictalurus pricei*	U.S.A. (AZ), Mexico	Entire	T	157	17.95(e)	17.44(g)
[Added by 49 FR 34494, August 31, 1984]							
Cavefish, Alabama	*Speoplatyrhinus poulsoni*	U.S.A. (Alabama)	do	T	25	17.95(e)	NA
Cavefish, Ozark	*Amblyopsis rosae*	U.S.A. (AR, MO, OK)	Entire	T	18e	NA	NA
[Added by 49 FR 43968, November 1, 1984]							
Chub, bonytail	*Gila elegans*	U.S.A. (AZ, CA, CO, NV, UT, WY)	do	E	92	NA	NA
Chub, Borax Lake	*Gila boraxobius*	U.S.A. (Oregon)	do	E	124	17.95(e)	NA
Chub, Chihuahua	*Gila nigrescens*	U.S.A. (New Mexico) (Chihuahua)	Entire	T		NA	[illegible]
	[Added by 48 FR 46057, October 11, 1983]						
Chub, humpback	*Gila cypha*	U.S.A. (AZ, CO, UT, WY)	do	E	1	NA	NA
Chub, Mohave tui	*Gila bicolor mohavensis (=G. mohavensis)*.	U.S.A. (California)	do	E	2	NA	NA
Chub, slender	*Hybopsis cahni*	U.S.A. (TN, VA)	do	T	28	17.95(e)	17.44(e)
Chub, spotfin	*Hybopsis monacha*	U.S.A. (AL, GA, NC, TN, VA)	do	T	28	17.95(e)	17.44(c)
Chub, Yaqui	*Gila purpurea*	U.S.A. (AZ), Mexico	Entire	E	197	17.95(e)	N/A
[Added by 49 FR 34494, August 31, 1984]							
Cicek (minnow)	*Acanthorutilus handlirschi*	Turkey	do	E	3	NA	NA
Cisco, longjaw (Removed by 48 FR 39941, September 2, 1983)							
Cui-ui	*Chasmistes cujus*	U.S.A. (Nevada)	do	E	1	NA	NA
Dace, Ash Meadows speckled	*Rhinichthys osculus nevadensis*	do	do	E	117E 12/E	17.95(e)	NA
Dace, Ash Meadows speckled	*Rhinichthys osculus nevadensis*	U.S.A. (NV)	Entire	E		17.95(e)	NA
	[Added by 48 FR 40184, September 2, 1983]						
Dace, Kendall Warm Springs	*Rhinichthys osculus thermalis*	U.S.A. (Wyoming)	do	E	2	NA	NA
Dace, Moapa	*Moapa coriacea*	U.S.A. (Nevada)	do	E	1	NA	NA
Darter, bayou	*Etheostoma rubrum*	U.S.A. (Mississippi)	do	T	10	NA	17.44(a)
Darter, fountain	*Etheostoma fonticola*	U.S.A. (Texas)	do	E	2	17.95(e)	NA
Darter, leopard	*Percina pantherina*	U.S.A. (AR, OK)	do	T	31	17.95(e)	17.44(e)
Darter, Maryland	*Etheostoma sellare*	U.S.A. (Maryland)	do	E	1	NA	NA
Darter, Okaloosa	*Etheostoma okaloosae*	U.S.A. (Florida)	do	E	9	NA	NA
Darter, slackwater	*Etheostoma boschungi*	U.S.A. (AL, TN)	do	T	28	17.95(e)	17.44(e)
Darter, snail	*Percina tanasi*	U.S.A. (AL, GA, TN)	Entire	T	12,150	NA	NA
[Revised by 49 FR 27514, July 5, 1984]							
Darter, watercress	*Etheostoma nuchale*	U.S.A. (Alabama)	do	E	2	NA	NA
Gambusia, Big Bend	*Gambusia gaigei*	U.S.A. (Texas)	do	E	1	NA	NA
Gambusia, Clear Creek	*Gambusia heterochir*	do	do	E	1	NA	NA
Gambusia, Amistad (=Goodenough)	*Gambusia amistadensis*	do	do	E	93	NA	NA
Gambusia, Pecos	*Gambusia nobilis*	U.S.A. (NM, TX)	do	E	2	NA	NA
Gambusia, San Marcos	*Gambusia georgei*	U.S.A. (Texas)	do	E	98	17.95(e)	NA
Killifish, Pahrump	*Empetrichthys latos*	U.S.A. (Nevada)	do	E	1	NA	NA
Madtom, Scioto	*Noturus trautmani*	U.S.A. (Ohio)	do	E	10	NA	NA
Madtom, Smoky	*Noturus baileyi*	U.S.A. (TN)	Entire	E	183	17.95(e)	NA.
[Added by 49 FR 43069, October 26, 1984]							
Madtom, yellowfin	*Noturus flavipinnis*	U.S.A. (GA, TN, VA)	do	T	28	17.95(e)	44(c)
Nekogigi (catfish)	*Coreobagrus ichikawai*	Japan	do	E	1	NA	NA
Pike, blue (Removed by 48 FR 39943, September 2, 1983)							
Pupfish, Ash Meadows Amargosa	*Cyprinodon nevadensis mionectes*	U.S.A. (Nevada)	do	E	1-'E 127F	17.95(e)	NA
Pupfish, Ash Meadows Amargosa	*Cyprinodon nevadensis mionectes*	U.S.A. (NV)	Entire	E		17.95(e)	NA
	[Added by 48 FR 40184, September 2, 1983]						

[Sec. 17.11(h)]

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
Pupfish, Comanche Springs	*Cyprinodon elegans*	U.S.A. (Texas)	do	E	1	NA	NA
Pupfish, Devils Hole	*Cyprinodon diabolis*	U.S.A. (Nevada)	do	E	1	NA	NA
Pupfish, Leon Springs	*Cyprinodon bovinus*	U.S.A. (Texas)	do	E	102	17.95(e)	NA
Pupfish, Owens Area	*Cyprinodon radiosus*	U.S.A. (California)	do	E	6	1	NA
Pupfish, Warm Springs	*Cyprinodon nevadensis pectoralis*	U.S.A. (Nevada)	do	E	2	NA	NA
Shiner, beautiful	*Notropis formosus*	U.S.A. (AZ, NM), Mexico	Entire	T	157	17.95(e)	17.44(g)

[Added by 49 FR 34494, August 31, 1984]

Squawfish, Colorado	*Ptychocheilus lucius*	U.S.A. (AZ, CA, CO, NM, NV, UT, WY), Mexico.	do	E	1	NA	NA
Stickleback, unarmored threespine	*Gasterosteus aculeatus williamsoni*	U.S.A. (California)	do	E	8	NA	NA
Sturgeon, shortnose	*Acipenser brevirostrum*	U.S.A. and Canada (Atlantic Coast)	do	E	1	NA	NA
Tango, Miyako (Tonyo entering)	*Tanakia tanago*	Japan	do	E	3	NA	NA
Temoset, Ikan (Hennoe)	*Probarbus jullieni*	Thailand, Cambodia, Vietnam, Malaysia, Laos.	do	E	15	NA	NA
Topminnow, Gila	*Poeciliopsis occidentalis*	U.S.A. (AZ, NM), Mexico	do	E	1	NA	NA
Totoaba (seafood or weakfish)	*Cynoscion macdonaldi*	Mexico (Gulf of California)	do	E	45	NA	NA
Trout, Apache (=Arizona)	*Salmo apache*	U.S.A. (Arizona)	do	T	1, 8	NA	17.44(g)
Trout, Gila	*Salmo gilae*	U.S.A. (New Mexico)	do	E	1	NA	NA
Trout, greenback cutthroat	*Salmo clarki stomias*	U.S.A. (Colorado)	do	T	1, 38	NA	17.44(b)
Trout, Lahontan cutthroat	*Salmo clarki henshawi*	U.S.A. (CA, NV)	do	T	2, 8	NA	17.44(g)
Trout, Little Kern golden	*Salmo aguabonita whitei*	U.S.A. (California)	do	T	37	17.95(e)	17.44(b)
Trout, Paiute cutthroat	*Salmo clarki seleneris*	do	do	T	1, 8	NA	17.44(b)
Woundfin	*Plagopterus argentissimus*	U.S.A. (AZ, NV, UT)	do	E	2	NA	NA
SNAILS							
Snail, Chittenango ovate amber	*Succinea chittenangoensis*	U.S.A. (New York)	NA	T	41	NA	NA
Snail, flat-spired three-toothed	*Triodopsis platysayoides*	U.S.A. (West Virginia)	NA	T	41	NA	NA
Snail, Iowa Pleistocene	*Discus macclintocki*	U.S.A. (Iowa)	NA	E	41	NA	NA
Snail, Manus Island tree	*Papustyla pulcherrima*	Admiralty Islands (Manus Islands)	NA	E	3	NA	NA
Snail, noonday	*Mesodon clarki nantahala*	U.S.A. (North Carolina)	NA	T	41	NA	NA
Snail, Oahu tree	*Achatinella* spp. (all species)	U.S.A. (Hawaii)	NA	E	108, 112	NA	NA
Snail, painted snake coiled forest	*Anguispira picta*	U.S.A. (Tennessee)	NA	T	41	NA	NA
Snail, Stock Island	*Orthalicus reses*	U.S.A. (Florida)	NA	T	41	NA	NA
Snail, Virginia fringed mountain	*Polygyriscus virginianus*	U.S.A. (Virginia)	NA	E	41	NA	NA
CLAMS							
Pearly mussel, Alabama lamp	*Lampsilis virescens*	U.S.A. (AL, TN)	NA	E	15	NA	NA
Pearly mussel, Appalachian monkey-face	*Quadrula sparsa*	U.S.A. (TN, VA)	NA	E	15	NA	NA
Pearly mussel, birdwing	*Conradilla caelata*	do	NA	E	15	NA	NA
Pearly mussel, Cumberland bean	*Villosa (=Micromya) trabalis*	U.S.A. (Kentucky)	NA	E	15	NA	NA
Pearly mussel, Cumberland monkey-face	*Quadrula intermedia*	U.S.A. (AL, TN, VA)	NA	E	15	NA	NA
Pearly mussel, Curtis'	*Epioblasma (=Dysnomia) florentina curtisi*	U.S.A. (Missouri)	NA	E	15	NA	NA
Pearly mussel, dromedary	*Dromus dromas*	U.S.A. (TN, VA)	NA	E	15	NA	NA
Pearly mussel, green-blossom	*Epioblasma (=Dysnomia) torulosa gubernaculum*	do	NA	E	15	NA	NA
Pearly mussel, Higgins eye	*Lampsilis higginsi*	U.S.A. (IL, IA, MN, MO, NE, WI)	NA	E	15	NA	NA
Pearly mussel, Nicklin's	*Megalonaias nickliniana*	Mexico	NA	E	15	NA	NA
Pearly mussel, orange-footed	*Plethobasus cooperianus*	U.S.A. (AL, IN, IA, KY, OH, PA, TN)	NA	E	15	NA	NA
Pearly mussel, pale lilliput	*Toxolasma (=Carunculina) cylindrella*	U.S.A. (AL, TN)	NA	E	15	NA	NA
Pearly mussel, pink mucket	*Lampsilis orbiculata*	U.S.A. (AL, IL, IN, KY, MO, OH, PA, TN, WV)	NA	E	15	NA	NA
Pearly mussel, Samsodra [Removed by 45 FR 1058, January 9, 1980]					15		
Pearly mussel, Tamaico	*Cyprogenia aberti tecomatensis*	Mexico	NA	E	15	NA	NA
Pearly mussel, tuberculed-blossom	*Epioblasma (=Dysnomia) torulosa*	U.S.A. (IL, KY, TN, WV)	NA	E	15	NA	NA
Pearly mussel, turgid-blossom	*Epioblasma (=Dysnomia) turgidula*	U.S.A. (AL, TN)	NA	E	15	NA	NA
Pearly mussel, white cat's paw	*Epioblasma (=Dysnomia) sulcata delicata*	U.S.A. (IN, IA, OH)	NA	E	15	NA	NA
Pearly mussel, white wartyback	*Pleurobema decisum*	U.S.A. (AL, TN)	NA	E	15	NA	NA
Pearly mussel, yellow-blossom	*Epioblasma (=Dysnomia) florentina florentina*	do	NA	E	15	NA	NA
Pigtoe, fine-rayed	*Fusconaia cuneolus*	U.S.A. (AL, TN, VA)	NA	E	15	NA	NA
Pigtoe, rough	*Pleurobema plenum*	U.S.A. (KY, TN, VA)	NA	E	15	NA	NA
Pigtoe, shiny	*Fusconaia edgariana*	U.S.A. (AL, TN, VA)	NA	E	15	NA	NA
Pocketbook, fat	*Potamilus (=Proptera) capax*	U.S.A. (AR, IA, MO, OH)	NA	E	15	NA	NA
Rifle shell, tan	*Epioblasma walkeri*	U.S.A. (KY, TN, VA)	NA	E	27	NA	NA
CRUSTACEANS							
Amphipod, Hay's spring	*Stygobromus hayi*	U.S.A. (District of Columbia)	NA	E	115	NA	NA
Isopod, Madison Cave	*Antrolana lira*	U.S.A. (VA)	NA	T	123	NA	17.46(b)
Isopod, Socorro	*Thermosphaeroma (=Exosphaeroma) thermophilus*	U.S.A. (New Mexico)	Ent	E	36	NA	NA
Shrimp, Kentucky cave	*Palaemonias ganteri*	U.S.A. (KY)	NA	E		17.95(h)	NA
	[Added by 48 FR 46341, October 12, 1983]						
INSECTS							
Beetle, Delta green ground	*Elaphrus viridis*	U.S.A. (California)	NA	T	100	17.95(i)	NA
Beetle, valley elderberry longhorn	*Desmocerus californicus dimorphus*	do	NA	T	99	17.95(i)	NA
Butterfly, Bahama swallowtail	*Papilio andraemon bonhotei*	U.S.A. (FL), Bahamas	NA	T	13	NA	17.47(a)
Butterfly, El Segundo Blue	*Euphilotes (=Shijimiaeoides) battoides allyni*	U.S.A. (California)	NA	E	14	NA	NA

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
INSECTS							
Butterfly, Lange's metalmark	*Apodemia mormo langei*	...do	NA	E	14	NA	NA
Butterfly, Lotis blue	*Lycaeides argyrognomon lotis*	...do	NA	E	14	NA	NA
Butterfly, mission blue	*Icaricia icarioides missionensis*	...do	NA	E	14	NA	NA
Butterfly, Oregon silverspot	*Speyeria zerene hippolyta*	U.S.A. (OR, WA)	NA	T	95	17.95(f)	NA
Butterfly, Palos Verdes blue	*Glaucopsyche lygdamus palosverdesensis*	U.S.A. (California)	NA	E	92	17.95(f)	NA
Butterfly, San Bruno elfin	*Callophrys mossii bayensis*	...do	NA	E	14	NA	NA
Butterfly, Schaus swallowtail	*Heraclides (Papilio) aristodemus ponceanus*	U.S.A. (FL)	NA	E	13,159	NA	16A

[Added by 49 FR 34504, August 31, 1984]

Butterfly, Schaus swallowtail	*Papilio aristodemus ponceanus*	U.S.A. (Florida)	NA	T	13	16A	17.47(g)
Butterfly, Smith's blue	*Euphilotes (=Shijimiaeoides) enoptes smithi.*	U.S.A. (California)	NA	E	14	NA	NA
Moth, Kern primrose sphinx	*Euproserpinus euterpe*	...do	NA	T	51	NA	NA

§—Indicates FR where species was delisted; relisting of the species is indicated by subsequent number(s).
E—Indicates Emergency rule publication (see FR document for effective dates), subsequent number(s) listed, FR first rule, if applicable.
EFFECTIVE DATE NOTE: At 48 FR 612, January 5, 1983, the Ash Meadows speckled dace and the Ash Meadows Amargosa pupfish were again added by an emergency rule to the Endangered Species list. This emergency determination was effective January 5, 1983, and will expire September 2, 1983.

EDITORIAL NOTE: For "When listed" citations, see list following.

1—52 FR 4001; March 11, 1987
2—35 FR 16697; October 15, 1970.
3—35 FR 8495; June 2, 1970.
4—35 FR 18320; December 2, 1970.
5—37 FR 5876; March 30, 1972.
6—38 FR 14879; June 4, 1973.
7—39 FR 44991; December 30, 1974.
8—40 FR 28884; July 16, 1975.
9—40 FR 31736; July 28, 1975.
10—40 FR 44151; September 25, 1975.
11—40 FR 44419; September 26, 1975.
12—40 FR 47905; October 9, 1975.
13—41 FR 17740; April 28, 1976.
14—41 FR 22044; June 1, 1975
15—41 FR 24004; June 14, 1975.
16—41 FR 45383; October 15, 1976.
17—41 FR 51021; November 18, 1975.
18—21 FR 51812; November 23, 1975.
19—41 FR 33094; December 9, 1976.
20—42 FR 2076; January 10, 1977.
21—42 FR 2995; January 14, 1977.
23—42 FR 25137; June 2, 1977.
24—42 FR 28546; June 3, 1977.
25—42 FR 37373; July 21, 1977.
26—42 FR 40285; August 11, 1977.
27—42 FR 42383; August 23, 1977.
28—42 FR 45528; September 9, 1977.
29—42 FR 58755; November 11, 1977
30—42 FR 60745; November 28, 1977
31—43 FR 3715; January 27, 1978
32—43 FR 4086; January 31, 1975
33—43 FR 4821; February 3, 1975.
34—43 FR 52J3; February 14, 1972
35—43 FR 9812; March 9, 1978.
36—43 FR 12861; March 27, 1978.
37—43 FR 15428; April 13, 1978
38—43 FR 16345; April 18, 1978.
40—43 FR 20504; May 12, 1978.
41—43 FR 28332; July 3, 1978.
42—43 FR 32808; July 28, 1978.
43—43 FR 34478; August 4, 1978.
44—43 FR 44812; September 28, 1978.
45—44 FR 21289; April 10, 1978.
46—44 FR 23084; April 17, 1978
48—44 FR 29480; May 21, 1978.
50—44 FR 37126; June 25, 1978.
51—44 FR 37133; June 25, 1978
52—44 FR 42811; July 20, 1979.
54—44 FR 49230; August 21, 1978
55—44 FR 54007; September 17, 1978.
60—44 FR 38064; October 12, 1978
65—44 FR 68238; November 30, 1978.
66—44 FR 70677; December 7, 1978
67—44 FR 75078; December 18, 1978
68—45 FR 18010; March 20, 1980.
90—45 FR 21833; April 2, 1980.
91—45 FR 24080; April 8, 1980.
92—45 FR 27711; April 23, 1980.
93—45 FR 28722; April 30, 1980.
94—45 FR 39831; May 28, 1980.
99—19 FR 44935; July 2, 1980
96—45 FR 44938; July 2 1980
97—45 FR 47352; July 14, 1980.
98—45 FR 47355; July 14, 1980
99—45 FR 52803; August 8, 1980.
100—45 FR 52807; August 8, 1980.
102—45 FR 34878; August 15 1980.
103—43 FR 55C5A; August 20, 1980.
105—45 FR 63812; September 25, 1980
108—43 FR 85132; October 1, 1980.
109—46 FR 3178; January 13, 1981
111—46 FR 11865; February 10, 1981.
112—46 FR 40029; August 6, 1981.
113—46 FR 40684; August 10, 1981.
114—47 FR 4204; January 28, 1982.
115—17 FR 5425, February 9, 1982.
117—47 FR 19995; May 10, 1982.
118—47 FR 31970; July 21, 1982.
120—47 FR 43701; October 4, 1982.
124—47 FR 43982; October 5 1982.
125—47 FR 46093; October 15 1982.
127—48 FR 612 January 5 1983.
130—48 FR 1720; January 14 1983
126—46 FR 28484; June 22, 1983.

§17.12 Endangered and threatened plants.

(a) The list in this section contains the names of all species of plants which have been determined by the Services to be Endangered or Threatened. It also contains the names of species of plants treated as Endangered or Threatened because they are sufficiently similar in appearance to Endangered or Threatened species (see §17.50 et seq.).

(b) The columns entitled "Scientific Name," and "Common Name," defined the species of plant within the meaning of the Act. Although common names are included, they cannot be relied upon for identification of any specimen, since they may vary greatly in local usage. The Services shall use the most recently accepted scientific name. In cases in which confusion might arise, a synonym(s) will be provided in parentheses. The Services shall rely to the extent practicable on the *International Code of Botanical Nomenclature.*

(c) In the "Status" column the following symbols are used: "E" for Endangered, "T" for Threatened, and "E [or T] (S/A)" for similarity of appearance species.

(d) The other data in the list are nonregulatory in nature and are provided for the information of the reader. In the annual revision and compilation of this Title, the following information may be amended without public notice: the spelling of species' names, historical range, footnotes, references to certain other applicable portions of this Title, synonyms, and more current names. In any of these revised entries, neither the species, as defined in paragraph (b) of the section, nor its status may be changed without following the procedures of Part 424 of this Title.

(e) The "Historic Range" indicates the known general distribution of the species or subspecies as reported in the current scientific literature. The present distribution may be greatly reduced from this historic range. This column does not imply any limitation on the application of the prohibitions in the Act or implementing rules. Such prohibitions apply to all individuals of the plant species, wherever found.

(f)(1) A footnote to the Federal Register publication(s) listing or reclassifying a species is indicated under the column "When Listed." Footnote numbers to §§17.11 and 17.12 are in the same nu-

merical sequence, since plants and animals may be listed in the same Federal Register document. That document, at least since 1973, includes a statement indicating the basis for the listing, as well as the effective date(s) of said listing.

(2) The "Special Rules" and "Critical Habitat" columns provide a cross reference to other sections in Parts 17, 222, 226, or 227. The term "NA" (not applica-226, or 227. The "Special Rules" column will also be used to cite the special rules which describe experimental populations and determine if they are essential or nonessential. Separate listings will be made for experimental populations, and the status column will include the following symbols: "XE" for an essential experimental population and "XN" for a nonessential experimental population. The term "NA" (not applicable) appearing in either of these two columns indicates that there are no special rules and/or Critical Habitat for that particular species. However, all other appropriate rules in Parts 17, 217—227, and 402 still apply to that species. In addition, there may be other rules in this Title that relate to such plants, e.g., port-of-entry requirements. It is not intended that the references in the "Special Rules" column list all the regulations of the two Services which might apply to the species or to the regulations of other Federal agencies or State or local governments.

[17.12(f)(2) amended by 49 FR 33892, August 27, 1984]

(g) The listing of a particular taxon includes all lower taxonomic units [see §17.11(g) for examples].

(h) The "List of Endangered and Threatened Plants" is provided below:

Species		Historic range	Status	When listed	Critical habitat	Special rules
Scientific name	Common name					
AGAVACEAE—Agave family						
Agave arizonica ..... *Arizona agave*	Arizona agave	U.S.A. (AZ)	E		NA	NA
[Added by 49 FR 21058, May 18, 1984]						
Alismataceae—Water-plantain family:						
Sagittaria fasciculata	Bunched arrowhead	U.S.A. (NC, SC)	E	83	NA	NA
Asteraceae—Aster family:						
Bidens cuneata	Cuneate bidens	U.S.A. (HI)	E		NA	NA
[Added by 49 FR 6102, February 17, 1984]						
Dyssodia tephroleuca	Ashy dogweed	U.S.A. (TX)	E		NA	NA
[Added by 49 FR 29234, July 19, 1984]						
Echinacea tennesseensis	Tennessee purple coneflower	U.S.A. (TN)	E	49	NA	NA
Lipochaeta venosa	Nena	U.S.A. (HI)	E	73	[illegible]	NA
Senecio franciscanus	San Francisco Peaks groundsel (Added by 48 FR 52746, November 22, 1983)	U.S.A. (AZ)	T	137	17.96(d)	NA
Stephanomeria malheurensis	Malheur wire-lettuce	U.S.A. (OR)	E	128	17.86(a)	NA
Berberidaceae—Barberry family:						
Mahonia sonnei (= *Berberis s.*)	Truckee barberry	U.S.A. (CA)	E	78	NA	NA
Betulaceae—Birch family:						
Betula uber	Virginia round-leaf birch	U.S.A. (VA)	E	39	NA	NA
Brassicaceae—Mustard family:						
Arabis macdonaldiana	McDonald's rock-cress	U.S.A. (CA)	E	44	NA	NA
Erysimum capitatum var. *angustatum*	Contra Costa wallflower	U.S.A. (CA)	E	38	17.96(d)	NA
Thelypodium stenopetalum	Slender-petaled mustard	U.S.A. (CA)	E	158	NA	NA
[Added by 49 FR 34500, August 31, 1984]						
Cactaceae—Cactus family:						
Ancistrocactus tobuschii (= *Echinocactus L. Mammillaria L.*)	Tobusch fishhook cactus	U.S.A. (TX)	E	80	NA	NA
Cereus robinii	Key tree-cactus	U.S.A. (FL), Cuba	E		NA	NA
[Added by 49 FR 29237, July 19, 1984]						
Coryphantha minima (= *C. nellieae, Escobaria R., Mammillaria R.*)	Nellie cory cactus	do	E	91	NA	NA
Coryphantha ramillosa	Bunched cory cactus	U.S.A. (TX), Mexico (Coahuila)	T	77	NA	NA
Coryphantha sneedii var. *leei* (= *Escobaria L, Mammillaria L.*)	Lee pincushion cactus	U.S.A. (NM)	T	61	NM	NA
Coryphantha sneedii var. *sneedii* (= *Escobaria S., Mammillaria S.*)	Sneed pincushion cactus	U.S.A. (TX) NM)	E	82	NA	NA
Echinocactus horizonthalonius var. *nicholii*	Nichol's Turk's head cactus	U.S.A. (AZ)	E	71	NA	NA
Echinocereus engelmannii var. *purpureus*	Purple-spined hedgehog cactus	U.S.A. (IA)	E	98	NA	NA
Echinocereus fendleri var. *kuenzleri* (= *E. kuenzleri, E. hempelii* of authors, not Fobe).	Kuenzler hedgehog cactus	U.S.A. (NM)	E	70	NA	NA
Echinocereus lloydii (= *E. triglochidiatus* var. *l.*)	Lloyd's hedgehog cactus	U.S.A. (TX)	E	87	NA	NA
Echinocereus reichenbachii var. *albertii* (= *E. melanocentrus*).	Black lace cactus	do	E	86	NA	NA
Echinocereus triglochidiatus var. *arizonicus* (= *E. arizonicus*).	Arizona hedgehog cactus	U.S.A. (AZ)	E	82	NA	NA
Echinocereus triglochidiatus var. *mojavensis* (= *E. coccineus* var. *c., E. grandiflorus* var. *c.*).	Spineless hedgehog cactus	U.S.A. (CO, UT)	E	83	NA	NA
Echinocereus viridiflorus var. *davisii* (= *E. davisii*)	Davis' green pitaya	U.S.A. (TX)	E	81	NA	NA
Neolloydia mariposensis (= *Echinocactus m., Echinomastus m.*)	Lloyd's Mariposa cactus	do	T	77	NA	NA
Panicum carteri	Carter's panicgrass	U.S.A. (NJ)	E		17.96(d)	NA
[Added by 48 FR 46331, October 12, 1983]						
Pediocactus bradyi (= *Toumeya b.*)	Brady pincushion cactus	U.S.A. (AZ)	E	69	NA	NA
Pediocactus knowltonii (= *Toumeya k.*)	Knowlton cactus	U.S.A. (NM, CO)	E	78	NA	NA

Species		Historic range	Status	When listed	Critical habitat	Special rules
Scientific name	Common name					
Pediocactus peeblesianus var. peeblesianus (= Echinocactus p., Navajoa p., Toumeya p., Utahia p.).	Peebles Navajo cactus	U.S.A. (AZ)	E	69	NA	NA
Pediocactus sileri (= Echinocactus s., Utahia s.)	Siler pincushion cactus	U.S.A. (AZ, UT)	E	64	NA	NA
Sclerocactus glaucus (= Echinocactus g., E. subglaucus, E. whipplei var. g., Pediocactus g., S. franklinii).	Uinta Basin hookless cactus	U.S.A. (CO, UT)	T	89	NA	NA
Sclerocactus mesae-verdae (= Coloradoa m., Echinocactus m., Pediocactus m.).	Mesa Verde cactus	U.S.A. (CO, NM)	T	75	NA	NA
Sclerocactus wrightiae (= Pediocactus w.)	Wrights fishhook cactus	U.S.A. (UT)	E	58	NA	NA
Caryophyllaceae—pink family						
Schiedea adamantis	Diamond Head Schiedea	U.S.A. (HI)	E		NA	NA
[Added by 49 FR 6102, February 17, 1984]						
Cistaceae—Rockrose family:						
Hudsonia montana	Mountain golden heather	U.S.A. (NC)	T	107	17.96(a)	NA
Crassulaceae—Stonecrop family:						
Dudleya Traskiae	Santa Barbara Island liveforever	U.S.A. (CA)	E	39	NA	NA
Cupressaceae—Cypress family:						
Fitzroya cupressoides	Chilean false larch (=alerce)	Chile, Argentina	T	78	NA	NA
Ericaceae—Heath family:						
Arctostaphylos hookeri ssp. ravenii	Raven's manzanita	U.S.A. (CA)	E	45	NA	NA
Rhododendron chapmanii	Chapman rhododendron	U.S.A. (FL)	E	47	NA	NA
Euphorbiaceae—Spurge family:						
Euphorbia skottsbergii var. kalaeloana	Ewa Plains 'akoko	U.S.A. (HI)	E	139	NA	NA
[Corrected by 48 FR 34961, August 2, 1983]						
Jatropha Costaricensis	Costa Rican jatropha	Costa Rica	E	154	NA	NA
[Added by 49 FR 30201, July 27, 1984]						
Fabaceae—Pea family:						
Astragalus perianus	Rydberg milk-vetch	U.S.A. (UT)	T	39	NA	NA
Baptisia arachnifera	Hairy rattleweed	U.S.A. (GA)	E	39	NA	NA
Lotus dendroideus (= scoparius) ssp. traskiae	San Clemente Island broom	U.S.A. (CA)	E	28	NA	NA
Vicia menziesii	Hawaiian vetch	U.S.A. (HI)	E	39	NA	NA
Frankeniaceae—Frankenia family:						
Frankenia johnstonii	Johnston's frankenia	U.S.A. (TX)	E		NA	NA
		Mexico (Nuevo Leon)				
[Added by 49 FR 31421, August 7, 1984]						
Hydrophyllaceae—Waterleaf family:						
Phacelia argillacea	None	U.S.A. (UT)	E	44	NA	NA
Phacelia formosula	North Park phacelia	U.S.A. (CO)	E	121	NA	NA
Lamiaceae—Mint family:						
Haplostachys haplostachya var. angustifolia	None	U.S.A. (HI)	E	73	NA	NA
Hedeoma apiculatum	McKittrick pennyroyal	U.S.A. (TX, NM)	T	116	17.96(a)	NA
Hedeoma todsenii	Todsen's pennyroyal	U.S.A. (NM)	E	110, 112	17.95(a)	NA
Pogogyne abramsii	San Diego mesa mint	U.S.A. (CA)	E	44	NA	NA
Stenogyne angustifolia var. angustifolia	None	U.S.A. (HI)	E	73	NA	NA
Liliaceae—Lily family:						
Harperocallis flava	Harper's beauty	U.S.A. (FL)	E	57	NA	NA
Trillium persistens	Persistent trillium	U.S.A. (GA, SC)	E	39	NA	NA
Malvaceae—Mallow family:						
Callirhoe scabriuscula	Texas poppy-mallow	U.S.A. (TX)	E	109, 112	NA	NA
Kokia cookei	Cooke's kokio	U.S.A. (HI)	E	74	NA	NA
Kokia drynarioides	kokio (=Hau-hele'ula or Hawaii tree cotton)	U.S.A. (HI)	E		17.96(a)	NA
[Added by 49 FR 47400, December 4, 1984]						
Malacothamnus clementinus	San Clemente Island bush-mallow	U.S.A. (CA)	E	26	NA	NA
Sidalcea pedata	Pedate checker-mallow	U.S.A. (CA)	E	198	NA	NA
[Added by 49 FR 34500, August 31, 1984]						
Nyctaginaceae—Four-o'clock family: *Mirabilis macfarlanei*	MacFarlane's four-o'clock	U.S.A. (ID, OR)	E	56	NA	NA
Onagraceae—Evening-primrose family:						
Oenothera avita ssp. eurekensis	Eureka Valley evening-primrose	U.S.A. (CA)	E	39	NA	NA
Oenothera deltoides ssp. howellii	Antioch Dunes evening-primrose	do	E	39	17.96(a)	NA
Orchidaceae—Orchis family:						
Isotria medeoloides	Small whorled pogonia	Canada (Ontario) and U.S.A. (CT, IL, MA, MD, ME, MI, MO, NC, NH, NJ, NY, PA, RI, SC, VA, VT)	E	122	NA	NA
Spiranthes parksii	Navasota ladies'-tresses	U.S.A. (Texas)	E	116	NA	NA
Papaveraceae—Poppy family: *Arctomecon humilis*	Dwarf bear-poppy	U.S.A. (UT)	E	78	NA	NA
Pinaceae—Pine family: *Abies guatemalensis*	Guatemalan fir (=pinsapo)	Mexico, Guatemala, non-surveyed El Salvador	T	94	NA	NA
Poaceae—Grass family:						
Oreutia mistronesia	Solano (=Crampton's Oreuti) grass	U.S.A. (CA)	E	44	NA	NA
Swallenia alexandrae	Eureka Dune grass	do	E	39	NA	NA
Zizania texana	Texas wild-rice	U.S.A. (TX)	E	39	17.96(a)	NA

[Sec. 17.12(h)]

Species		Historic range	Status	When listed	Critical habitat	Special rules
Scientific name	Common name					
Polygonaceae—Buckwheat family:						
Eriogonum gypsophilum	Gypsum wild-buckwheat	U.S.A. (NM)	T	110, 112	17.96(a)	NA
Eriogonum pelinophilum	Clay-loving wild-buckwheat	U.S.A., (CO)	E		17.96(a)	NA
[Added by 49 FR 26565, July 13, 1984]						
Ranunculaceae—Buttercup family:						
Aconitum noveboracense	Northern wild monkshood U.S.A. (IA, NY, OH, Vt)	U.S.A. (Is, NY, Oh, Wi)	T	39	NA	NA
Delphinium kinkiense	San Clemente island larkspur	U.S.A. (CA)	E	26	NA	NA
Rhamnaceae—Buckthorn family:						
Gouania hillebrandii	None	U.S.A. (HI)	E		17.96(a)	NA
[Added by 49 FR 44756, November 9, 1984]						
Rosaceae—Rose family:						
Cowania subintegra	Arizona cliffrose	U.S.A. (AZ)	E	147	NA	
[Added by 49 FR 22329, May 29, 1984]						
Potentilla robbinsiana	Robbins' cinquefoil	U.S.A. (NH, VT)	E	109	17.96(a)	NA
Sarraceniaceae—Pitcher plant family:						
Sarracenia oreophila	Green pitcher plant	U.S.A. (AL, GA)	E	56, 66	NA	NA
Scrophulariaceae—Snapdragon family:						
Castilleja grisea	San Clemente Island indian paintbrush	U.S.A. (AC)	E	26	NA	NA
Coryphantha minimus ssp. *minimus*	Salt marsh bird's beak	U.S.A. (CA, Mexico (Baja California).	E	44	NA	NA
Pedicularis furbishiae	Furbish lousewort	U.S.A. (ME), Canada (New Brunswick).	E	36	NA	NA
Styracaceae—Styrax family:						
Styrax texanus	Texas snowbells	U.S.A. (TX)	E		NA	NA
[Added by 49 FR 40038, October 12, 1984]						
Taxaceae—Yew family:						
Torreya taxifolia	Florida torreya	U.S.A. (FL, GA)	E		na	na
[Added by 49 FR 2786, January 23, 1984]						

E—indicates Emergency rule subsection (see FR document for effective dates); subsequent number(s) indicate FR final rule, if applicable.
EDITORIAL NOTE: For "When listed" citations, see list following.

26—42 FR 40685; August 11, 1977.
39—43 FR 17919; April 26, 1978.
44—43 FR 45812; September 29, 1978.
47—43 FR 29490; April 26, 1978.
49—44 FR 32605; June 6, 1979.
53—44 FR 43701; July 25, 1979.
66—44 FR 54623; September 21, 1979.
57—44 FR 58868; October 5, 1979.
58—44 FR 58666; October 11, 1979.
59—44 FR 58670; October 11, 1979.
61—44 FR 61558; October 25, 1979.
62—44 FR 61560; October 29, 1979.
63—44 FR 61766; October 26, 1979.
64—44 FR 61766; October 26, 1979.
65—44 FR 61911; October 26, 1979.
66—44 FR 61913; October 26, 1979.
67—44 FR 61916; October 26, 1979.
68—44 FR 61920; October 26, 1979.
69—44 FR 61927; October 26, 1979.
70—44 FR 61927; October 26, 1979.
71—44 FR 61929; October 26, 1979.
72—44 FR 62286; October 29, 1979.
73—44 FR 62466; October 30, 1979.
74—44 FR 62471; October 30, 1979.
75—44 FR 62474; October 30, 1979.
76—44 FR 64247; November 6, 1979.
77—44 FR 64250; November 9, 1979.
78—44 FR 64252; November 6, 1979.
79—44 FR 64733; November 7, 1979.
80—44 FR 64736; November 7, 1979.
81—44 FR 64740; November 7, 1979.
82—44 FR 64743; November 7, 1979.
83—44 FR 64746; November 7, 1979.
84—44 FR 66008; November 8, 1979.
86—46 FR 18529; March 24, 1980.
109—45 FR 61844; September 17, 1980.
107—46 FR 66360; October 20, 1980.
108—46 FR 3184; January 13, 1981.
110—46 FR 5730; January 16, 1981.
112—46 FR 40025; August 6, 1981.
116—47 FR 19836; May 6, 1982.
118—47 FR 30440; July 13, 1982.
120—47 FR 38648; August 24, 1982.
121—47 FR 39540; September 1, 1982.
122—47 FR 39827; September 10, 1982.
129—47 FR 50688; November 16, 1982.

§17.13 Amendments to the lists. [Reserved]

[Sec. 17.13]

REFERENCE NO. 10

BORDEN CHEMICAL PRINTING

Lat: 39°56'43"N Long: 75°06'26"W

List of Dataset: NJJ4 Number of Records = 6 Group = 1

REC #	POP	HOUSE	DISTANCE	SECTOR
1	14	4	0.400000	1
2	3505	1002	0.810000	1
3	26391	8078	1.60000	1
4	50114	17270	3.20000	1
5	154242	60548	4.80000	1
6	286439	111764	6.40000	1

Rec #	Distance	Population	Houses
1	¼ mile	14	4
2	½ mile	3,519	1,006
3	1 mile	29,910	9,084
4	2 miles	80,024	26,354
5	3 miles	234,266	86,902
6	4 miles	520,705	198,666

REFERENCE NO. 11

SURFACE WATER QUALITY STANDARDS

N.J.A.C. 7:9-4.1 et seq.

May 1985

New Jersey Department of Environmental Protection/Division of Water Resources

Surface Water Classifications

Surface Water Quality Standards
N.J.A.C. 7:9-4

Index C-
Surface Water Classifications of the Delaware River Basin

May 1985

State of New Jersey Department of Environmental Protection/Division of Water Resources

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

Surface Water Quality Standards

Adopted:	April 29, 1985 by Robert E. Hughey, Commissioner, Department of Environmental Protection
Authority:	N.J.S.A. 13:1D-1 et seq., 58:10A-1 et seq., and 58:11A-1 et seq.
Effective Date:	May 20, 1985
Expiration Date pursuant to Executive Order No.66 (1978):	May 20, 1990

DATE 4/29/85

Robert P. Hughey

ROBERT E. HUGHEY, Commissioner
Department of Environmental Protecti

CEDAR BRANCH (Millville) - See NANTUXENT CREEK	
CEDAR CREEK	
(Dividing Creek Station) - Entire length, except portions described separately below	FW2-NT
(Millville) - Those tributaries to Cedar Creek that originate in and are located entirely within the boundaries of the Millville Fish and Game Tract	FW1
CEDARVILLE POND (Cedarville)	FW2-NT(C1)
CHERRY TREE CREEK (Mad Horse Creek) - Entire length	SE1(C1)
CLARKS POND (Bridgeton)	FW2-NT(C1)
CLEARVIEW CREEK (Hampton) - Source to Alms House Brook	FW2-NT
CLINT MILLPOND	FW2-NT(C1)
CLOVE [MILL] BROOK	
(Montague) - Lake Marcia outlet to State line, except tributaries described below	FW2-TP(C1)
(High Point State Park) - The second and third northerly tributaries to Clove Brook, the tributaries to Steeny Kill Lake, and those tributaries downstream of Steeny Kill Lake that originate in High Point State Park downstream to their confluence with Clove Brook or to the High Point State Park Boundaries	FW1 [tp]
(High Point State Park) - Those northerly tributaries to Mill Brook that are located due west of Steeny Kill Lake, within the boundaries of High Point State Park	FW1 [tp]
COHANSEY RIVER (Bridgeton) - Entire length	FW2-NT/SE1
COOPER BRANCH - See RANCOCAS CREEK	
COOPER CREEK (Camden) - Entire length	FW2-NT
COPPERMINE BROOK (Pahaquarry) - Entire length	FW1
COURTENY PONDS (Egg Island)	FW2-NT/SE1(C1)
CRANBERRY LAKE (Byram)	FW2-TM(C1)
CRANBERRY LAKE OUTLET STREAM	
(Byram) - Entire length within Cranberry Lake State Park	FW2-NT(C1)
(Byram) - Stream outside of Cranberry Lake State Park	FW2-NT
CRISS BROOK (Stokes State Forest) - Entire length	FW1
CROSSWICKS CREEK (Bordentown) - Entire length	FW2-NT
CROW CREEK (S. Dennis) - Entire length	FW2-NT/SE1(C1)
CULVER'S CREEK (Frankford) - Entire length	FW2-TM
CULVER'S LAKE (Frankford)	FW2-TM
DEER PARK BRANCH - See RANCOCAS CREEK	
DEER PARK POND	
(Allamuchy) - Pond, tributaries and outlet stream within Allamuchy State Park, except those tributaries classified as FW1, below	FW2-NT(C1)

(c) In all FW2 waters the designated uses are:

1. Maintenance, migration and propagation of the natural and established biota;

2. Primary and secondary contact recreation;

3. Industrial and agricultural water supply;

4. Public potable water supply after such treatment as required by law or regulation; and

5. Any other reasonable uses.

(d) In all SEI waters the designated uses are:

1. Shellfish harvesting in accordance with N.J.A.C. 7:12;

2. Maintenance, migration and propagation of the natural and established biota;

3. Primary and secondary contact recreation; and

4. Any other reasonable uses.

(e) In all SE2 waters the designated uses are:

1. Maintenance, migration and propagation of the natural and established biota;

2. Migration of diadromous fish;

3. Maintenance of wildlife;

4. Secondary contact recreation; and

5. Any other reasonable uses.

(f) In all SE3 waters the designated uses are:

1. Secondary contact recreation;

2. Maintenance and migration of fish populations;

3. Migration of diadromous fish;

4. Maintenance of wildlife; and

5. Any other reasonable uses.

(g) In all SC waters the designated uses are:

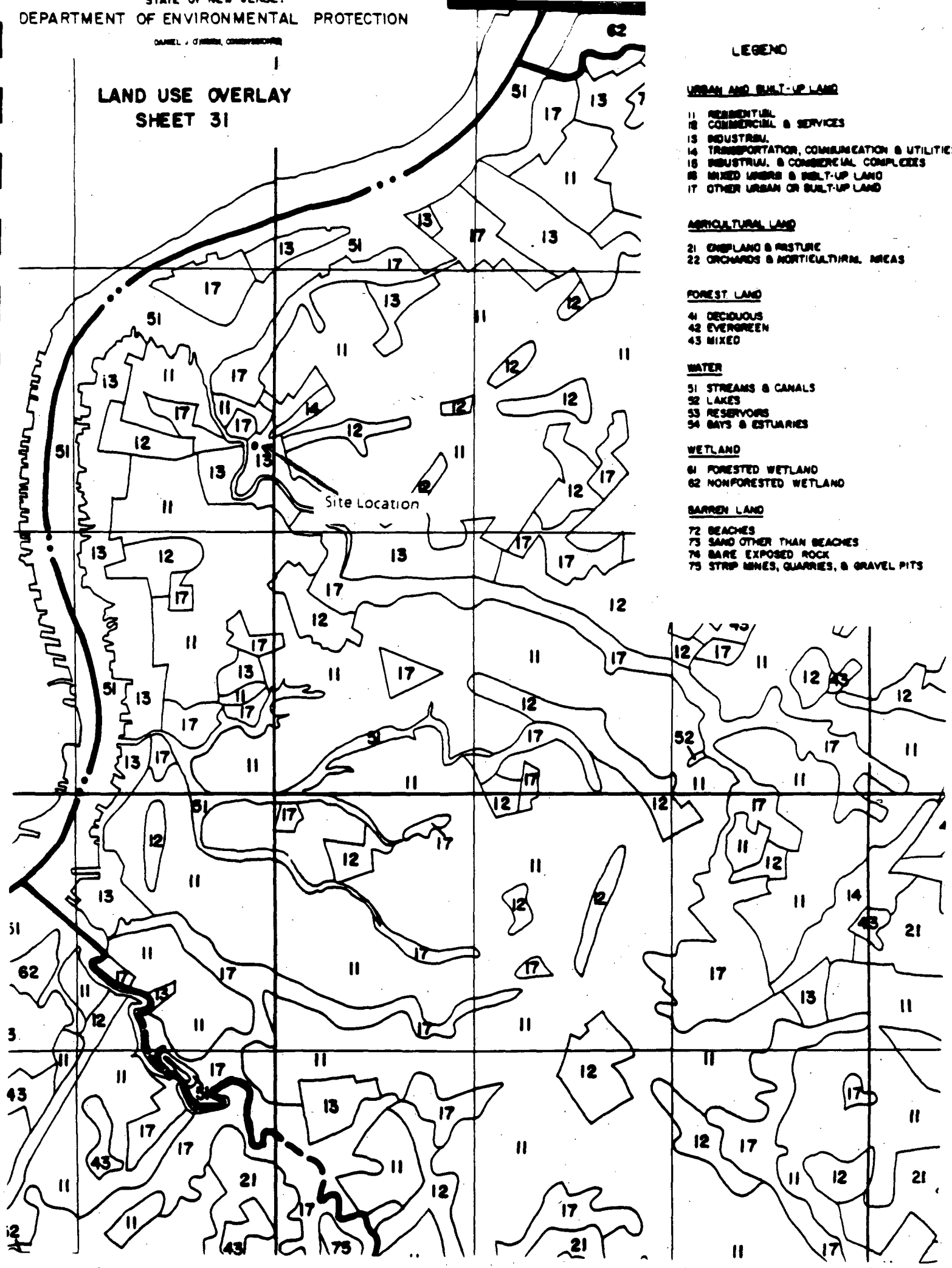
1. Shellfish harvesting in accordance with N.J.A.C. 7:12;

REFERENCE NO. 12

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DANIEL J. O'HERN, COMMISSIONER

LAND USE OVERLAY SHEET 31



LEGEND

URBAN AND BUILT-UP LAND

11 RESIDENTIAL
12 COMMERCIAL & SERVICES
13 INDUSTRIAL
14 TRANSPORTATION, COMMUNICATION & UTILITIES
15 INDUSTRIAL & COMMERCIAL COMPLEXES
16 MIXED URBAN & BUILT-UP LAND
17 OTHER URBAN OR BUILT-UP LAND

AGRICULTURAL LAND

21 CROPLAND & PASTURE
22 ORCHARDS & HORTICULTURAL AREAS

FOREST LAND

41 DECIDUOUS
42 EVERGREEN
43 MIXED

WATER

51 STREAMS & CANALS
52 LAKES
53 RESERVOIRS
54 BAYS & ESTUARIES

WETLAND

61 FORESTED WETLAND
62 NONFORESTED WETLAND

BARREN LAND

72 BEACHES
73 SAND OTHER THAN BEACHES
74 BARE EXPOSED ROCK
75 STRIP MINES, QUARRIES, & GRAVEL PITS

REFERENCE NO. 13

BORDEN INC
180 EAST BROAD STREET, COLUMBUS, OHIO 43215

THOMAS R. HEATON
ENVIRONMENTAL SPECIALIST
ENVIRONMENTAL AFFAIRS

September 24, 1981

USEPA, Region II
26 Federal Plaza
New York, New York 10007

Re: Borden Chemical, Printing Ink Division
Camden, New Jersey, EPA ID # NJD071462279

Dear Sirs:

This letter is to notify your office of the termination of production activity at the above referenced facility on May 31, 1981. Borden, Inc. submitted notification of hazadous waste activity at this site on August 14, 1980 and applied for a permit to store hazardous waste at this site on November 18, 1980.

Borden, Inc. is aware of and apologizes for its failure to notify USEPA of this closure in a timely manner. However, Borden has attempted to meet the intent of the RCRA closure requirements and describes its closure activities in the accompanying report.

Borden, Inc. wishes to cooperate in any way possible. If you have any questions, please call the undersigned.

Sincerely,

Thomas R Heaton

Thomas R. Heaton

TRH:emh

Attachment

cc: W. B. Barton
F. Rosenbloom

CLOSURE PROCEDURE

BORDEN CHEMICAL, PRINTING INK DIVISION

CAMDEN, N.J.

Principally, the Borden Chemical Printing Ink plant in Camden processed printing ink which was manufactured from oleo-resinate vehicles into which we dispersed colorants by the use of mixing equipment and three-roll mill dispersers. After processing through this equipment, the materials were packed into shipping containers and distributed to customers.

Another type of ink that we manufactured at the Camden location was water base ink (hydrosperse). These inks had a different resin system and a much lower viscosity in the final product. The type of equipment used was high speed mixing equipment plus semi-continuous media mill for dispersion. Once again, the resin system, water, and colorants were mixed and then dispersed. After quality control checks, the final ink was packaged and distributed to customers and/or stock. A third type of product made at the Camden plant was dispersed carbon black in water. The type of equipment was similar to water base ink manufacture except the dispersion equipment was large ball mills--no mixers were involved.

The Printing Ink plant manufactured oil base printing inks and water base dispersions over the past seven years. The plant has been closed and the equipment and raw materials, as well as finished goods, have been transferred to other plant locations.

Equipment designated as transferable was dismantled, cleaned, and shipped to respective plants. Some of the excess equipment was sold. All the other equipment used at the location has been moved and sold as scrap to an accredited dealer.

Raw material that had not been consumed was shipped to one of several plants that will manufacture the products previously made at the Camden operation. Finished goods that had not been shipped to customers were also transferred to the appropriate plants.

On the second floor of the operating portion of the plant, we had a series of storage tanks that were drained and rinsed with an appropriate solvent; manholes were removed, and tanks were made available for drying. Those tanks that had been on the site, but not used by Borden, had the manholes removed and allbwed to dry. These unused tanks remain on-site. The rinsate/residue was properly disposed of as a hazardous waste.

Drums of solid waste were consolidated and properly disposed of. Included in this material was rinse and residue from cleaning equipment, tanks, and obsolete material so designated.

The underground fuel oil storage remains, containing a certain amount of fuel oil that will be transferred to the new owner.

Those areas that have concrete pads for floors were swept clean, and the materials were discarded in a proper manner. The first floor area of the main warehouse, which has a woodblock floor, contained dirt and dust particles; however, the woodblocks are set on top of concrete, so little or no permeation occurred. The roof area was inspected for possible accumulation of waste.

A total of 734 drums of hazardous waste has been removed from Borden Chemical since closure activity was initiated. Enclosed herewith are copies of the New Jersey and Delaware State manifest forms for these wastes. The nature of these wastes are printing ink wastes (general) and varnish wastes, described by EPA identification numbers K086 and D000, respectively. (Please note that the varnish wastes were incorrectly designated as "D999" on shipments with the New Jersey manifest numbers 0011098, 0013272, and 0013267). Table 1 displays the dates of pick-up and disposal, the manifest numbers and the quantities of waste disposed.

Table 1: Shipments of Hazardous Waste from Borden Chemical, Camden, New Jersey

	New Jersey Manifest #	Date of Pick-Up	Number of Drums	Delaware Manifest #	Date Received	Number of Drums
1.	0011094	5-12-81	78	05054	5-14-81	78
2.	0011095	5-13-81	85	05055	5-16-81	85
3.	0011096	5-13-81	83	05058	5-15-81	83
4.	0011097	5-15-81	84	05056	5-16-81	84
5.	0011098	5-15-81	84	05057	5-17-81	84
6.	0013266	5-16-81	87	05059	5-16-81	87
7.	0013268	5-17-81	62	05061	5-17-81	62
8.	0013272	5-16-81	90	05060	5-18-81	90
9.	0013267	5-17-81	81	05043	5-18-81	81

REFERENCE NO. 14

SELECTED INFORMATION OF WELLS FROM THE GROUND WATER SITE INVENTORY DATABASE
CAMDEN COUNTY

USGS UNIQUE ID	SITE ID	LATITU	LONGTU	MUNICIPALITY	SITE OWNER	LOCAL IDENTIFIER	DATE COMPLETED	USE OF SITE	ORIG WATER USE	CURR WATER USE	LAT LON ACC
070044	395508075070201	395508	750702	CAMDEN CITY	CURLEY CO INC	1	/ /	W	N	N	F
070045	395508075070202	395308	750702	CAMDEN CITY	CURLEY CO INC	2	/ /	W	N	N	F
070046	395512075064001	395512	750640	CAMDEN CITY	CAMDEN CITY U D	CITY 11	01/01/1942	W	P	P	S
070047	395523073072901	395524	750729	CAMDEN CITY	CAMDEN SEWAGE A	SEWAGE PLANT 1	01/11/1954	U	U	U	S
070048	395527075064601	395527	750646	CAMDEN CITY	CAMDEN CITY W D	CITY 6N	01/20/1948	W	P	U	F
070049	395527075064602	395527	750646	CAMDEN CITY	CAMDEN CITY W D	CITY 6-1928	09/10/1928	Z	P	U	S
070050	395526075053801	395526	750538	CAMDEN CITY	SIOLLWRECK, A N	2-1950	02/17/1950	W	N	N	S
070051	395530075071901	395530	750719	CAMDEN CITY	GALLAGHERS WHSE	EVRSN LVRNG 5	01/01/1929	W	N	N	F
070052	395530075071902	395530	750719	CAMDEN CITY	GALLAGHERS WHSE	EVRSN LVRNG 4	/ /	W	N	N	F
070053	395532075071901	395532	750719	CAMDEN CITY	GALLAGHERS WHSE	EVRSN LVRNG 6	/ /	W	N	N	F
070054	395532075072001	395532	750720	CAMDEN CITY	GALLAGHERS WHSE	EVRSN LVRNG 2	01/01/1933	W	N	N	F
070055	395534075072401	395534	750724	CAMDEN CITY	GALLAGHERS WHSE	EVRSN LVRNG 1	01/01/1929	W	N	N	F
070056	395534075072402	395534	750724	CAMDEN CITY	GALLAGHERS WHSE	EVRSN LVRNG 3	/ /	W	N	N	F
070057	395539075054101	395539	750541	CAMDEN CITY	CURLADY HOSP	STAND BY WELL	09/18/1963	W	M	M	S
070058	395539075063001	395539	750630	CAMDEN CITY	N JERSEY HOSP	N JERSEY HOSP1	12/08/1958	W	T	T	S
070059	395540075074201	395540	750742	CAMDEN CITY	CAMDEN CITY W D	CITY 8	01/01/1928	Z	P	U	S
070060	395540075074202	395540	750742	CAMDEN CITY	CAMDEN CITY W D	CITY 8A	07/29/1953	Z	P	U	F
070061	395541075062201	395541	750622	CAMDEN CITY	CAMDEN CITY W D	CITY 4	01/01/1950	W	P	U	F
070062	395541075062202	395541	750622	CAMDEN CITY	CAMDEN CITY W D	CITY 4-1935	08/14/1935	W	P	U	S
070063	395541075062203	395541	750622	CAMDEN CITY	CAMDEN CITY W D	CITY 4-1922	01/01/1922	W	P	U	S
070064	395546075053301	395546	750533	CAMDEN CITY	CAMDEN CITY W D	CITY 17	05/13/1954	W	P	P	F
070065	395550075072901	395550	750729	CAMDEN CITY	CAMDEN CITY W D	CITY 2B	11/02/1953	Z	P	U	S
070066	395550075072902	395550	750729	CAMDEN CITY	CAMDEN CITY W D	CITY 2A	08/05/1927	Z	P	U	S
070067	395551075072501	395551	750725	CAMDEN CITY	PUBLIC SERV E-G	PSEGC 14	01/01/1950	W	N	N	S
07006B	395552075053501	395557	750535	CAMDEN CITY	CAMDEN CITY U D	CITY 13	06/19/1953	W	P	P	F
070069	395554075074701	395554	750747	CAMDEN CITY	FLINTKOTE CORP	14-COKE PLANT	05/27/1950	Z	N	U	F
070070	395557075062901	395557	750629	CAMDEN CITY	CAMDEN CITY W D	CITY 3A	12/31/1953	Z	P	U	S
070071	395557075062902	395557	750629	CAMDEN CITY	CAMDEN CITY W D	CITY 3-1934	01/01/1934	W	P	U	S
070072	395557075062903	395557	750629	CAMDEN CITY	CAMDEN CITY W D	CITY 3-1922	04/24/1922	W	P	U	S
070073	395602075074401	395602	750744	CAMDEN CITY	FLINTKOTE CORP	PSEGC 7	01/01/1947	Z	N	U	F
070074	395603075073601	395603	750736	CAMDEN CITY	PUBLIC SERV E-G	PSEGC 8	01/01/1955	W	N	N	F
070075	395604075073501	395604	750735	CAMDEN CITY	FLINTKOTE CORP	6 REPLACEMENT	01/01/1954	Z	N	U	F
070076	395614075063301	395616	750632	CAMDEN CITY	CAMDEN CITY W D	CITY 5-1928	05/04/1928	W	P	U	F
070077	395614075063302	395616	750632	CAMDEN CITY	CAMDEN CITY U D	CITY 5-1937	01/01/1937	W	P	U	F
070078	395615075063301	395616	750632	CAMDEN CITY	CAMDEN CITY W D	CITY 5N	10/24/1963	W	P	P	F
070079	395617075071001	395617	750710	CAMDEN CITY	CAMDEN CITY U D	CITY 12	01/01/1945	W	P	P	S
070080	395630075060101	395630	750601	CAMDEN CITY	HOLLINGSHEAD, R	1-1928	01/01/1928	W	N	N	S
070081	395637075060301	395637	750603	CAMDEN CITY	FARIS PRODUCE C	REPLACEMENT	03/06/1964	W	N	N	F
070082	395637075063301	395637	750633	CAMDEN CITY	BALTIMORE MKTS	CAMDEN 2	12/05/1950				M
070083	395638075062201	395638	750622	CAMDEN CITY	CAMDEN CITY W D	CITY 1A	12/17/1953	W	P	U	F
070084	395638075062202	395638	750622	CAMDEN CITY	CAMDEN CITY W D	CITY 1-1922	01/01/1922	W	P	U	
070085	395638075071101	395638	750711	CAMDEN CITY	STANLEY CORP AM	STANLEY THEATR	06/23/1949				F
070086	395639075070401	395639	750704	CAMDEN CITY	SAVAR AMUSEMENT	SAVAR THEATRE	03/13/1950				F

REFERENCE NO. 15

EPA

ACKNOWLEDGEMENT OF NOTIFICATION OF HAZARDOUS WASTE ACTIVITY
(VERIFICATION)

This is to acknowledge that you have filed a Notification of Hazardous Waste Activity for the installation located at the address shown in the box below to comply with Section 3010 of the Resource Conservation and Recovery Act *(RCRA)*. Your EPA Identification Number for that installation appears in the box below. The EPA Identification Number must be included on all shipping manifests for transporting hazardous wastes; on all Annual Reports that generators of hazardous waste, and owners and operators of hazardous waste treatment, storage and disposal facilities must file with EPA; on all applications for a Federal Hazardous Waste Permit; and other hazardous waste management reports and documents required under Subtitle C of RCRA.

EPA I.D. NUMBER ➤ *NJD071462279

BORDEN INC
1625 FEDERAL ST
CAMDEN, NJ 08104

INSTALLATION ADDRESS ➤ 1625 FEDERAL ST
CAMDEN, NJ 08104

EPA Form 8700-128 (4-80) 10/09/80